

**BUILDING CLIMATE-RESILIENT COASTAL
COMMUNITIES: PERSPECTIVES FROM OREGON'S
STATE, LOCAL, AND TRIBAL PARTNERS**

HEARING
BEFORE THE
**SELECT COMMITTEE ON THE
CLIMATE CRISIS**
HOUSE OF REPRESENTATIVES
ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

HEARING HELD
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OREGON'S STATE, LOCAL, AND
TRIBAL PARTNERS**

WEDNESDAY, AUGUST 3, 2022

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON THE CLIMATE CRISIS,
Astoria, OR.

The Select Committee met, pursuant to call, at 10:00 a.m. (local time) at Clatsop Community College in Astoria, Oregon, Hon. Kathy Castor [Chair of the committee] presiding.

Present: Representatives Castor, Bonamici, and Carter.

Ms. CASTOR. Welcome to the field hearing of the U.S. House of Representatives Select Committee on the Climate Crisis.

We are thrilled to be here at Clatsop Community College in Astoria, Oregon. It is wonderful to be out of Washington, D.C. and out and about to listen to experts when it comes to the climate crisis.

We are thrilled to be here with a climate champion, Congresswoman Suzanne Bonamici, who has been instrumental on our committee in tackling climate solutions, especially when it comes to ocean health, workforce, and education.

So thank you, Representative Bonamici, very much, for inviting us out and hosting us.

I need to go through some housekeeping matters before we dive in to the hearing and opening statements, so here we go.

As a reminder, members participating in a hearing remotely should be visible on camera throughout the hearing. We may have some members Zooming in virtually, but we will see if that happens or not.

Members are responsible for controlling their own microphones. Members can be muted by staff only to avoid inadvertent background noise.

As a reminder, statements, documents, or motions must be submitted to the electronic repository to SCCC.repository@mail.house.gov.

Finally, members or witnesses experiencing technical problems should inform the committee staff immediately.

Well, good morning again, and thank you all for joining our hybrid hearing. Today we are thrilled to be in Astoria, Oregon to hear from state, local, and Tribal partners on their experiences addressing the climate crisis, particularly challenges facing coastal communities and the opportunities that they see in building more climate-resilient coasts.

All of the—the three members here in attendance today all represent coastal communities. I represent the Tampa Bay area, back in the State of Florida. My good friend, Congressman Buddy Carter, represents a beautiful part of the country, the entire coastline of the State of Georgia, so the southern Atlantic coast. And, of course, Congresswoman Bonamici.

We have already had a remarkable visit here in Oregon, by the way. And I want to thank Oregon State Parks for hosting us yesterday on the gorgeous coastline here at Ecola State Park down to Indian Beach. It's a remarkable, beautiful place that we know we need to protect going forward.

Representative Bonamici, I want to thank you, first of all, for being such a climate champion, not just for the State of Oregon, but for helping the Select Committee and the Congress chart the course on policy.

And let me also say to all of the Oregonians, our hearts are with you. I know this is kind of a poignant time, as we are coming out of another deadly heat wave, reminding us that the climate crisis is here and now, and it is underscoring the urgent need for action.

So today we are thrilled to listen to leaders from this beautiful region, whose work is crucial to building resilience, conserving habitats, and preserving the way of life here in Oregon and the entire Pacific Northwest. And we are grateful for the chance to hear their perspectives as we work to prepare coastal communities across America for the risks and impacts of the climate emergency.

Coastal ecosystems are crucial in our fight to solve the climate crisis. Mangroves, marshes, seagrasses, and other coastal habitats absorb huge amounts of heat-trapping carbon, storing it below the surface and helping to keep temperatures in check. In fact, these habitats sequester more carbon pollution per area than any habitat on land. They also work to mitigate the impacts from intense hurricanes, storm surge, and other climate-fueled threats.

But our coastal communities need help. Decreased oxygen, changes in waterflow, and other climate impacts are threatening our coasts, impacting the lives and livelihoods of the millions of Americans who live in coastal counties. Sea levels are rising in communities like my own, in the Tampa Bay area, threatening our economies and disrupting our way of life. And our ocean, which has absorbed between one-fifth and one-third of all human-caused carbon pollution since the 1980s, is warming at an alarming rate.

We know that coastal ecosystems play a key role in keeping global temperatures in check, which is why we must take steps to conserve these crucial habitats as part of our work to make our communities more resilient against the climate crisis.

Each coastal community is special. From the Gulf Coast to the South Atlantic, to the Pacific Northwest, our coasts are home to unique cultures and diverse local economies. And for that reason we know that Federal opportunities for climate action need to be regionally focused, culturally appropriate, and tailored to each community's environment.

And Congress plays a key role in supporting broad investments in coastal resilience, and the Federal Government should work with local, regional, and Tribal partners to develop solutions that fit their communities.

President Biden and Congress already have taken important steps with last year’s infrastructure law. And last week the Congress passed the bipartisan Science in Manufacturing legislation that Congresswoman Bonamici was central to passing in the Congress.

We are—and now we are at a point where we are hopeful that our Senate colleagues will send us additional investments in clean energy and climate solutions, maybe over the next week.

Addressing climate risks in coastal communities will also require that we look beyond the coastline. We must address all parts of the ecosystem, from far upstream to the open ocean, and tackle each challenge along the way. That is why expanding access to data and ongoing monitoring are essential for helping local partners make key decisions. And that is why we are grateful to hear from our witnesses today as we implement adaptation and mitigation measures across the country.

[The statement of Ms. Castor follows:]

Opening Statement of Chair Kathy Castor
Hearing on “Building Climate-Resilient Coastal Communities:
Perspectives from Oregon’s State, Local, and Tribal Partners”

August 3, 2022

As prepared for delivery

I’d like to start by thanking our colleague and climate champion, Rep. Suzanne Bonamici, for welcoming us to Oregon. Once again the region has had to deal with a deadly heatwave, reminding us that the climate crisis is here and now and underscoring the urgent need for action. We’re thrilled to listen to leaders from this beautiful region, whose work is crucial to building resilience, conserving habitats, and preserving the way of life here in Oregon and the entire Pacific Northwest. And we’re grateful for the chance to hear their perspectives, as we work to prepare coastal communities across America for the risks and impacts of the climate emergency.

Coastal ecosystems are crucial in our fight to solve the climate crisis. Mangroves, marshes, seagrasses, and other coastal habitats absorb huge amounts of heat-trapping carbon, storing it below the surface and helping keep temperatures in check. In fact, these habitats sequester more carbon pollution per area than any habitat on land. They also work to mitigate the impacts from intense hurricanes, storm surge, and other climate-fueled threats.

But our coastal communities need help. Decreased oxygen, changes in water flow, and other climate impacts are threatening our coasts, impacting the lives and livelihoods of the millions of Americans who live in coastal counties. Sea levels are rising in communities like my own in Tampa Bay, threatening our economies and disrupting our way of life. And our ocean—which has absorbed between one-fifth and one-third of all human-caused carbon pollution since the 1980s—is warming up at an alarming rate. We know coastal ecosystems play a key role in keeping global temperatures in check. Which is why we must take steps to conserve these crucial habitats, as part of our work to make our communities more resilient against climate threats.

Each coastal community is special. From the Gulf Coast, to the South Atlantic, to the Pacific Northwest, our coasts are home to unique cultures and diverse local economies. For that reason, we know federal opportunities for climate action need to be regionally focused, culturally appropriate, and tailored to each community’s environment. Congress plays a key role in supporting broad investments in coastal resilience, and the federal government should work with local, regional, and tribal partners to develop solutions that fit their own communities. President Biden and Congress have already taken important steps with last year’s infrastructure law and last week’s science and manufacturing legislation. We are hopeful our Senate colleagues will send us additional investments in clean energy and climate solutions later this week.

Addressing climate risks in coastal communities will also require that we look beyond the coastline. We must address all parts of the ecosystem—from far upstream to the open ocean—and tackle each challenge along the way. That’s why expanding

access to data and ongoing monitoring are essential for helping local partners make key decisions. And it's why we're grateful to hear from our witnesses today as we implement adaptation and mitigation measures across the country.

I will now yield the remainder of my time to Rep. Bonamici for a short opening statement.

Ms. CASTOR. I am now thrilled to yield time to my good friend, the climate champion from the Pacific Northwest, Representative Bonamici.

Ms. BONAMICI. Well, thank you so much, Chair Castor, and I want to welcome my colleagues on the Select Committee on the Climate Crisis to the majestic Oregon coast.

And thank you again to President Breitmeyer and Clatsop Community College for hosting us today, and also to Helen Keefe from the college, and all the staff here, and to the staff of the Select Committee and the staff from my office, for their help organizing this important field hearing.

The health of the ocean reflects the health of our planet. Clean beaches and waterways are critical to marine ecosystems and the coastal industries that rely on them. The ocean regulates weather and climate, and its waves and winds generate renewable energy.

Today our ocean and coastlines are threatened more than ever. The ocean has absorbed a significant amount of heat from human-caused global warming, and has also absorbed up to one-third of all carbon dioxide emissions. As the ocean continues absorbing heat, sea surface temperatures and climate patterns will change and sea levels will rise. By absorbing carbon dioxide, the ocean and estuaries become more acidic, destabilizing fisheries and threatening coastal communities and ecosystems.

I am very excited, as the Chair mentioned, that my bipartisan Coastal and Ocean Acidification Research and Innovation Act was recently sent to the President's desk as part of the historic CHIPS and Science Act. This will help coastal communities continue to address these challenges by strengthening investments in research and monitoring, and by increasing our understanding of the socio-economic consequences of inaction.

We need to do more. Important actions we could and should take include investing in ocean-based climate solutions like blue carbon, building a stronger blue economy, and bolstering the health of our ecosystems to protect our coastal communities and marine industries.

A healthy ocean is not a partisan issue. It is an area where we can and should and will work together to identify solutions and implement them.

I look forward to hearing from our witnesses today about what we can learn from the work being done in Oregon to help our country address these critical issues.

Thank you again, and I yield back to Chair Castor.

Ms. CASTOR. Thank you very much. At this time I am pleased to yield to the ranking Republican, who is in attendance today, our good friend, Congressman Buddy Carter of Georgia.

You are recognized.

Mr. CARTER. Thank you, Madam Chair, for holding this hearing, and thank all of you for being here, particularly you, Representative Bonamici. Thank you for hosting us in your beautiful district.

I have to tell you that I knew the physical features of this district were beautiful, but I was pleasantly surprised by the people that I have met in this area. If I didn't know better, I would say I was in the South. They really have been very, very nice, and we appreciate that very much.

I am also pleased to see how much Oregon and Georgia's First Districts have in common, despite being almost entirely on opposite sides of the country. Both are situated on the coasts of our states.

Yesterday we visited the Electric Island, where we saw innovation in electric vehicle charging. In my district it has been announced that Hyundai will be bringing an EV and battery manufacturing facility to our district. We are very excited about that. So it was good to see what I saw here yesterday.

Both of our districts also have significant ports, and that is very important, as well.

During our visit there yesterday we were able to see another common point with the importance of forests and forest products. I look forward to spending more time discussing that important issue today, especially with our witness here, Ms. Bell from Westervelt Ecological Services.

This trip has given us the opportunity to see every part of what I describe as the three things that we need to approach climate change. That is: innovation, adaptation, and mitigation. All of those are extremely important.

Unfortunately, instead of pursuing productive bipartisan policies in each of these areas, we are again seeing my colleagues across the aisle attempt to do it alone with a massive reconciliation spending deal.

Last week Senate Democrats announced a package that includes over \$400 billion in new spending for climate and health care, while increasing the tax burden on the American people. It proposes \$300 billion in taxes, just as we find ourselves in a recession. These taxes will hit every American.

The Joint Committee on Taxation finds that average tax rates will increase for nearly every income category in 2023 under the bill, directly violating the President's promise to not raise taxes on those earning less than \$400,000. Taxes will rise by \$16.7 billion in 2023 on Americans earning less than \$200,000 a year. Taxpayers earning between \$200,000 and \$500,000 will pay \$14.1 billion more.

What is worse is that, as Americans face the highest energy prices in my lifetime, the bill would lead to even higher energy prices. The legislation would reinstate and increase a long-lapsed tax on crude and imported petroleum products to 16.4 cents per gallon. It also includes a natural gas tax that will further increase prices. Higher energy prices are simply a regressive tax on those who can afford it the least in our country.

Despite its name as the Inflation Reduction Act, studies show the impact on inflation is statistically indistinguishable from zero. There isn't even any deficit reduction in the bill until 2027. The whole reason we find ourselves with increased inflation is because there is too much demand with too many dollars chasing too few products. More taxes and regulations from this bill are just more restrictions on the American economy to produce and grow.

Forty-nine point seven percent of the tax would be borne by the manufacturing industry. The National Association of Manufacturers says the tax in 2023 alone will reduce real GDP by \$68.5 billion, and cut labor income by \$17.1 billion. Of course, the ones who are not affected by the anti-competitive tax increases are those benefiting from the Green New Deal tax credits, picking the winners and losers of American energy.

What baffles me the most is that there are parts of this bill that we can agree on. There are parts of this bill we can agree on. But they are being forced through as part of the massive glut of partisan policies that are contradicted by other parts of the bill: there is a natural gas tax, but more lease sales for drilling on Federal lands; there is an agreement on permitting reform and an expansion of the 45Q carbon sequestration credit, but it increases the cost of fossil fuel production.

Clearly, there are certain policies we can agree on that move us in the right direction. But it disappoints me that we can't move forward in a way that keeps Americans competitive and energy costs affordable for families. We cannot continue to handicap ourselves while the true problem lies abroad.

Of course, the topic of today's hearing is building climate resilient coastal communities, with a focus on the work being done here in Oregon. We have seen some fascinating things so far, and I am eager to hear from the witnesses on some bipartisan lessons we can take from this trip, especially the role working forests have in providing climate solutions and growing our economy.

Thank you, Madam Chair, and I yield back.

Ms. CASTOR. Well, thank you, Mr. Carter. And I look forward to getting into a discussion of the Inflation Reduction Act, and the fact that it does not raise taxes on anyone with incomes less than 400,000. It really just closes the loopholes targeted at the largest corporations.

But we will get to that debate, because I know everyone here would like to dive in to policy and debate on climate solutions. So at this time, Representative Bonamici, I am going to turn to you to ask you to introduce our witnesses today.

Ms. BONAMICI. Thank you, Chair Castor. I will introduce our witnesses.

First, Ms. Aja DeCoteau is the Executive Director of the Columbia River Inter-Tribal Fish Commission, which works to provide a unified tribal voice in the management of Columbia River Basin fishery resources. Ms. DeCoteau is a citizen of the Confederated Tribes and Bands of the Yakama Nation. She has more than 20 years of experience, where she—working on natural resource management in the Columbia River Basin.

Next, Ms. Tyler Bell is Director for the Rocky Mountain Region at Westervelt Ecological Services. Ms. Bell primarily oversees the organization's restoration site planning and development, agency relations and coordination, business development, and management of regional staff. She has more than seven years of experience working on wetland and stream mitigation projects and other private-sector environmental restoration projects.

Dr. Elaine Placido is the Executive Director for the Lower Columbia River Estuary Partnership, a non-profit organization dedi-

cated to the restoration and care for the waters and ecosystems of the lower Columbia River. Dr. Placido is a Coast Guard veteran, and has 20-plus years of local government and non-profit experience.

And Dr. Francis Chan is the Director of the Cooperative Institute for Marine Ecosystem and Resource Studies, and an Associate Professor in the Department of Integrative Biology at Oregon State University. His work focuses on coastal oceans, including causes and implications of near shore low oxygen zones and of increasing ocean carbon levels. Dr. Chan also leads the Institute's research and conservation, protection, and restoration of marine resources.

Ms. CASTOR. Terrific. Thank you very much.

Ms. DeCoteau, you are recognized for five minutes to summarize your testimony. Welcome.

STATEMENT OF AJA DECOTEAU, EXECUTIVE DIRECTOR, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION; TYLER BELL, DIRECTOR, WESTERVELT ECOLOGICAL SERVICES, ROCKY MOUNTAIN REGION; DR. FRANCIS CHAN, DIRECTOR, COOPERATIVE INSTITUTE FOR MARINE ECOSYSTEM AND RESOURCE STUDIES, ASSOCIATE PROFESSOR, DEPARTMENT OF INTEGRATIVE BIOLOGY, OREGON STATE UNIVERSITY; AND DR. ELAINE PLACIDO, EXECUTIVE DIRECTOR, LOWER COLUMBIA ESTUARY PARTNERSHIP

STATEMENT OF AJA DECOTEAU

Ms. DECOTEAU. Good morning, Chair Castor, Ranking Member Carter, Representative Bonamici, and members of the committee. Thank you for this opportunity to share a Tribal perspective on the importance of addressing climate change and building resilient communities and natural systems to prepare for its impacts.

I am Aja DeCoteau, a citizen of the Yakama Nation, and also the Executive Director of the Columbia River Inter-Tribal Fish Commission, which is the coordinating fisheries agency of the Yakama, Umatilla, Warm Springs and Nez Perce tribes, whose treaty-reserved fishing rights cover large portions of the States of Washington, Oregon, and Idaho.

Tribal cultures throughout North America hold thousands of years of observations and adaptations and traditional knowledge of our homelands. Here in the Columbia Plateau, we refer to this wisdom as [speaking Native language], which is our word for the original natural law that governs the balance of life on earth. It is a spiritual philosophy rooted in a reciprocal and life-giving relationship between human beings and the natural world around them. Understanding [speaking Native language] not only provides a sustainable relationship with nature, but also strengthens our bond to one another as community.

For all that was taken or lost, especially for Native Americans, our relationship to the land and water remains. And so our natural resources are our cultural and community resources. At the heart of this relationship to the land are our sacred first foods: water, salmon, deer, fruits, and huckleberries. The culture and subsistence of Tribal members revolve around harvesting these foods, so any threats to them also pose a threat to our way of life.

Climate change is such a threat. As this change gets worse, more and more of the Basin's fish populations will be in peril. Today, 42 percent of the Snake River's spring and summer chinook populations have reached quasi-extinction thresholds. And by 2025, only 3 years from now, 77 percent of the runs are estimated to reach that level. This is just one facet of how climate change will result in significant adverse impacts to Tribal food security, cultural continuity, sovereignty, economic opportunities, ecosystem balance, human health, and environmental justice.

To address this, the Tribes, individually as well as cooperatively, have been hard at work to—developing plans, programs, and systems to mitigate the changes that have already occurred, and build resiliency to prepare for more severe impacts into the future. These innovative, successful programs benefit all people in the Northwest.

Our holistic salmon restoration plan, called Wy-Kan-Ush-Mi Wa-Kish-Wit, combines multiple scientific fields and Traditional Ecological Knowledge with a simple goal to put fish back in the rivers and protect the watersheds where fish live. It also addresses community-developed needs, with the understanding that the well-being of our communities are tied to the well-being of our natural resources and the ecological services that they provide.

Putting this plan into action over the past quarter century, the Tribes have identified issues and potential solutions to help protect and restore salmon, from the upper tributaries down the Columbia River main stem to the Pacific Ocean. Many of these issues involve migration difficulties through a warmer river system and the need for cold water refuges.

The Tribes are also concerned about climate change impacts on the ocean and the subsequent effects it has on salmon. An altered marine food web, acidification, hypoxia, sea level rise, and warming waters threaten to change ocean ecosystems in a way that may be detrimental to salmon, or change their behavior. Long-term monitoring, both in estuaries and the ocean, are essential to observing and predicting what is happening.

In 2020 CRITFC joined this effort when we assumed stewardship of CMOP, the Center for Coastal Margin Observation and Prediction here in Astoria. CMOP is a nationally renowned ocean and estuary program researching the linkage between the Columbia River and the Pacific Ocean. Its research better informs Tribal, state, and Federal management decisions.

Finally, we reiterate the importance of limiting global temperature increases to 1.5 degrees. This is the best case scenario to give us a chance to deal with the changes we are already experiencing. Implementing alternative energy sources are a major part of this effort. CRITFC and its member Tribes recognize that many of the threats that face salmon and lamprey are the result of energy production and consumption.

This year we released our latest Tribal Energy Vision. As the region and nation undergo an energy transition to renewable resources, the Tribes want to ensure that our electric power system supports healthy and harvestable fish and wildlife populations, protects Tribal treaty and cultural resources, and provides clean, reliable, and affordable electricity.

Tribes are disproportionately impacted by climate change due to our high dependence on first foods and relative vulnerability of our infrastructure. Yet Tribes have been inequitably funded in natural resource and wildlife conservation. Stable, long-term funding streams are the greatest tool available to allow Tribes to engage in direct climate impact decision-making, and allow us to bring both our Traditional Ecological Knowledge and contemporary science capacities to the management and policy tables for the shared benefit of everyone.

Working together as partners, the Federal Government and Tribes can successfully preserve, protect, and manage our lands, rivers, and resources from the impacts of climate change. This will benefit all of our future generations.

Thank you for the opportunity to testify.
[The statement of Ms. DeCoteau follows:]

Written Testimony of Aja DeCoteau

Executive Director, Columbia River Inter-Tribal Fish Commission

**Testimony for the Field Hearing of the U.S. House of Representatives
Select Committee on the Climate Crisis**

**“Building Climate-Resilient Coastal Communities:
Perspectives from Oregon’s State, Local, and Tribal Partners”**

August 3, 2022

Good morning, Chairwoman Kathy Castor and members of the Committee. My name is Aja DeCoteau. I am the executive director of the Columbia River Inter-Tribal Fish Commission (CRITFC), the fisheries technical and coordinating agency for the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe. The treaty tribes are an integral part and partner of Columbia Basin fisheries co-management across the Columbia Basin and into the ocean where many of our aquatic resources migrate.

Over 20,000 CRITFC tribal members live within the Columbia River Basin. This 258,000-square-mile river basin encompasses large portions of the states of Washington, Oregon, and Idaho, and also reaches into Wyoming, Utah, Nevada, and the Canadian province of British Columbia. The ceded lands of the CRITFC member tribes cover 66,575 square miles, which is approximately one quarter of the entire basin.

Recognizing that this hearing’s primary focus is coastal resilience in the face of climate change, I would like to describe our cultural connection to the First Foods—water, salmon, game, roots, berries. The culture and subsistence of tribal members revolve around the harvesting of these foods. Climate change impacts to the First Foods, particularly salmon, are expected to be dire. The tribes are doing all that they can to make the First Foods as resilient as possible.

Salmon, steelhead, and Pacific lamprey are dependent on cold streams and rivers. Climate change has imperiled many of these populations due to reduced winter snowfall, altered seasonal stream flow patterns, and increased water temperatures.

Salmon and Pacific lamprey have been cornerstones of tribal cultures for thousands of years. The Columbia River tribes are particularly reliant on salmon for their spiritual, economic, and nutritional sustenance. Our unique cultures and histories are intertwined with salmon, and we have considerable knowledge about the best approaches to preserve and replenish salmon. One example of our connection is expressed by the Confederated Tribes of the Umatilla Indian Reservation in their “First Foods” approach to natural resources planning by holistically managing the entire ecosystem each First Food requires, knowing, for example, that a river ecosystem that is healthy for salmon will also be healthy for all the other plants and animals that depend on it.

This intimate connection to the seasonal gathering of the First Foods puts tribal members in a unique position to witness climate change impacts. A survey conducted by CRITFC in 2015 found that many tribal members were “surprised at the extent and high rate of change occurring within their lifetimes and were concerned

that climate change will result in ‘significant adverse impacts to tribal food security, cultural continuity, sovereignty, economic opportunities, ecosystem balance, human health, and environmental justice.’”

Tribal Climate Related Projects

In 1995, the tribes released Wy-Kan-Ush-Mi Wa-Kish-Wit, the “Spirit of the Salmon” restoration plan with the goal of “putting fish back in the rivers and restoring the watersheds where fish live.” This plan takes a holistic approach to salmon restoration in the Columbia Basin: First, it emphasizes the importance of the entire watershed to well-functioning rivers and streams. Second, it combines multiple scientific fields—including fish biology, ecology, and genetics—with traditional tribal knowledge, understanding, and respect for the natural world. And third, it factors in healthy human communities as part of healthy landscapes. The plan was updated in 2013 with climate change impacts identified as a major factor that needs specific attention.

Implementing this plan, CRITFC assesses key impacts of climate change on the natural resources of our member tribes, with a focus on watershed and habitat conditions supporting salmon, steelhead, and lamprey. Integrated analyses of interactions between physical, biologic and socio-economic processes, and development of decision support tools has allowed diverse stakeholders to evaluate sustainable future adaptation, mitigation, and restoration strategies.

Our habitat restoration projects are designed to protect, enhance, and restore functional floodplain, channel, and watershed processes to provide sustainable and healthy habitat for anadromous fish. Over the last decade, our member tribes implemented projects that resulted in more than 5,000 miles of improved stream flow, 400 miles of improved stream complexity, reconnected over 2,000 acres of floodplain, and improved 15,000 acres of riparian vegetation. These projects have often been done in partnership with landowners and ranchers, local and state governments, and a number of federal agencies.

CRITFC’s Acquisition of the Coastal Margin for Observation and Prediction (CMOP) Program

In order to strengthen the CRITFC tribes’ engagement with the estuary and ocean habitat needs of salmon and lamprey, CRITFC assumed stewardship of CMOP, the Center for Coastal Margin Observation and Prediction, in 2020. With a field program based in Astoria and a modeling program based in Portland, CMOP is a nationally renowned ocean and estuary research program dedicated to further understanding the linkage between the Columbia River and the Pacific Ocean. CMOP uses remote sensors, models, and open data access to help stakeholders manage ecosystems, facilitate sustainable development, and protect lives and livelihoods in our changing environment.

Physical parameters such as salinity, temperature, water levels, and currents have been measured and recorded since 1996 and biogeochemical parameters such as chlorophyll, turbidity, nitrate, and dissolved oxygen since 2008. These measurements provide a record of variability and change, allowing the identification of developing climate change threats to critical coastal and estuary ecosystems. Thanks to a community funding proposal supported by Rep. Bonamici, CMOP is currently planning to incorporate ocean acidification monitoring within the estuary, allowing a better understanding of how this developing threat impacts the estuary, and starting a long-term monitoring of changes of this threat over time.

The long history of physical observations also provides a strong basis for testing and improving models of the estuary and ocean, either at CMOP or elsewhere. CMOP’s models of the estuary allow short-term forecasts of conditions in the estuary, retrospective simulations of the past 20–30 years of estuary conditions, and simulations of potential scenarios, including sea level rise and changes in river discharge under climate change and hydro-system management decisions.

CMOP models have been used to evaluate habitat opportunity for juvenile salmon in the Columbia River estuary under different environmental conditions, and to improve understanding of the relationship between the Columbia River plume and juvenile salmon survival at ocean entry. With new funding from the community funding proposal, we are working to improve our models to better represent wetlands and to integrate stream flows from smaller tributaries to the estuary by integrating the NOAA National Water Model (NWM). By incorporating better representation of tidal wetlands and stream flows, the CMOP models will be better able to predict the impact of climate change on juvenile salmon habitat in the estuary. In addition to better representing wetland habitat, the integration of the NWM will allow CMOP models to simulate compound flooding events (when ocean storm surges and

rain events cause flooding driven both by ocean conditions and rain runoff) and provide the capacity to support local efforts to build coastal resilience through nature-based protection against flooding, which may also potentially improve juvenile salmon habitat in the estuary.

CRITFC Energy Vision for the Columbia River Basin

CRITFC and its member tribes recognize that many of the threats that face salmon and lamprey are the result of energy production and consumption. This year, we released our latest Tribal Energy Vision. As the region and nation undergo an energy transition to renewable sources, the tribes wanted to ensure that our electric power system supports healthy and harvestable fish and wildlife populations, protects tribal treaty and cultural resources, and provides clean, reliable, and affordable electricity. The four broad goals of this vision are:

- Create a regional energy portfolio that protects and enhances environmental quality, treaty protected resources, and supports the restoration of Columbia Basin's fish and wildlife to healthy and harvestable population levels.
- Prevent new and reduce ongoing damage to Columbia River Basin resources, including fish, wildlife, water quality, and tribal cultural resources, by recognizing the relationships and interdependencies of natural and built systems including the Northwest's energy system.
- Provide increased protection for both fish and wildlife and utility customers against unanticipated events, such as drought, fire, and market aberrations while providing an adequate, economical, and reliable electric supply.
- Mitigate climate change impacts to protect Northwest ecosystems by replacing fossil-fuel electric generation and reducing the reliance on fossil-fuels for power, transportation, and other uses.

Climate Resilient Recommendations

CRITFC recommends that the Committee consider two specific strategies to help front-line communities that depend on large river systems to become more resilient in their response to climate change. The first of these is to develop federal flood policies and guidelines that recognize the benefits and environmental capital of properly functioning floodplains. The second is to protect and restore cold water refuge areas that shelter fish populations from climate extremes.

Floodplain Reconnection

Floodplain protection and restoration are essential strategies in limiting the impact of climate change. Well managed floodplains can reduce flooding, store and cool surface water, provide rearing habitat for fish, and create cold water refugia for migrating salmon. Yet over the last 150 years, huge areas of floodplain have been drained and cut off from their rivers. While the annual costs of flooding are rising, the pressures to build in flood-prone areas continues. Congress needs to support a shift in land use policies that recognize the benefits and environmental capital of properly functioning floodplains. Floodplain reconnection will provide resiliency to climate change impacts.

In 2016, CRITFC hosted a Future of Our Salmon Conference with the theme "Healthy Floodplains, Living Rivers" to understand how floodplains in the Columbia River mainstem and its tributaries can be resilient to anticipated climate change impacts (<https://www.critfc.org/tribal-treaty-fishing-rights/policy-support/critfc-policy-workshops/future2016/>). The Conference resulted in a call to action for the region's agencies, tribes, and communities to achieve culturally and physically resilient floodplains that acknowledge and benefit all values and needs. A significant outcome of the conference was an action framework and planning committee that would work for no net loss of floodplain habitat and would recommend floodplain enhancement actions and policies.

Protection and Restoration of Cold-Water Refuge Areas

A cold water refugium is an area that is persistently colder than adjacent areas, such as tributary mouths. Climate refugia can facilitate the survival of fish that are sensitive to changing environmental conditions by providing discrete zones of cool water rearing or holding habitat during periods of stressful summer mainstem water temperatures. As rivers continue to warm, cold water refugia will become more essential to the survival of native fish populations. Policies and legislation that prioritize protecting and increasing cold water refugia are needed. Restoration actions needed specifically for the Columbia River include reconstruction of river con-

fluence areas to eliminate shallows, replanting native vegetation, and increasing channel depths.

Working as Co-managers and Partners on Climate Resiliency

Tribes are disproportionately impacted by climate change due to our high dependence on the First Foods and relative vulnerability of our infrastructure. Yet tribes have been inequitably funded in natural resource and wildlife conservation.

Historically tribes have not had the resources or capacity to fully participate in policy development and access to forums where climate impact decisions occur. Stable, long-term funding streams are the greatest tool available to allow tribes to engage in direct climate impact decision-making to natural resources. This would enable us to bring our traditional ecological knowledge and contemporary science capacities to the management and policy tables for the shared benefit of tribal and non-tribal publics alike. The funding should have wide sideboards to address the diverse challenges we face and have predictable, manageable reporting requirements co-developed by the tribes. The funding should be on a recurring basis and without competition.

These recommendations will help ensure that the nation upholds its trust responsibility to Indian tribes by protecting the fish, wildlife, and other natural resources vital to our tribal cultures, communities, and livelihoods, and ensuring that tribes are meaningful participants in the nation's efforts to reach the net zero carbon pollution level by mid-century. By taking a leadership role in securing equitable support for tribes, you can help us ensure the future well-being of our tribal natural resources, health and economies as well as foster the capacity of the tribes to meaningfully contribute to the greater national effort to combat climate change.

URL Addresses:

1. <https://www.critfc.org/tribal-treaty-fishing-rights/policy-support/critfc-policy-workshops/future2016/>
2. CRITFC Energy Vision for the Columbia River Basin:
<https://critfc.org/energy-vision/>

Ms. CASTOR. Thank you, Ms. DeCoteau.

Ms. Bell, you are now recognized for five minutes to provide a summary of your testimony. Good morning.

STATEMENT OF TYLER BELL

Ms. BELL. Thank you. Chairwoman Castor, Ranking Member Carter, and distinguished members of the House Select Committee on Climate Crisis, on behalf of the Westervelt Company, thank you for this opportunity to testify today.

My name is Tyler Bell. I am the Director of the Rocky Mountain Region of Westervelt Ecological Services.

Westervelt Ecological Services is a division of the Westervelt Company, a privately held, family-owned and operated business headquartered in Tuscaloosa, Alabama.

At Westervelt Ecological Services, wetlands, stream, and species mitigation is our business. Our high-quality conservation and mitigation projects include over 30,000 perpetually conserved acres. That is an area the size slightly larger than the city of Eugene, Oregon. The Westervelt Company was founded in 1884, and owns and manages over 600,000 acres of forested lands.

At the Westervelt Company, sustainability is both our responsibility and our legacy. Our commitment to environmental, social, and leadership standards is proven through our voluntary sustainability reporting. And The Westervelt Company and Westervelt Ecological Services are examples of how private sector companies can be vital to national climate resiliency efforts.

I am here today to discuss the importance of working forests, wood products, and restored landscapes, and climate resiliency, and

the ways in which you can help the private sector create an even larger restoration footprint.

U.S. forests and forest products offset 15 percent of U.S. industrial carbon emissions every year. Further, U.S. private working forests store an additional 82 billion metric tons of CO₂ equivalent. Westervelt's working forests alone store about 30.4 million metric tons of CO₂ equivalent.

Forests produce wood products, which are 50 percent stored carbon by weight. Each year, wood products add an additional 100 million metric tons of carbon to the nearly 10 billion tons of carbon stored in wood products. That is nearly three times the carbon stored in all U.S. national parks combined.

Our mitigation work furthers this commitment to stewardship. Compensatory mitigation is required when there is a permanent impact and loss of wetland or stream habitat. Westervelt is part of a larger mitigation and restoration industry that supports \$25 billion in economic output, and 225,000 jobs. We are a longstanding member of the Ecological Restoration Business Association, and we serve as technical experts in this association.

In addition to sharing the importance of working forests and wood products to climate health, I am here today to ask that the Federal Government support the private restoration industry in two ways: one, access to public restoration dollars.

Congress can incentivize and enlist the expertise, lands, and upfront capital of the private sector to meet the urgency of the climate change challenge. Privately funded mitigation providers have a proven record of working well with the U.S. Government to achieve development goals. Allowing private sector participation and public restoration initiatives will create jobs and revenue for the communities in which they occur.

It will also develop robust standards and accountability. This is partly because the private sector is accustomed to performance-based contracting, where a private company is paid upon proven delivery of an ecological outcome. This model stretches out the use of public dollars, and places risk of ecological success or failure on the private sector.

My second ask is the development of streamlined regulations and guidance. It is critical that industry and government work together to develop streamlined regulations. Without efficient permitting for infrastructure, investors withdraw from private mitigation solutions. This slows the permitting of projects, increases regulators' staff time evaluating individual mitigation plans, and has negative consequences for the environment. Working with the government to develop stable policy will offer the regulatory certainty needed for private sector investment and mitigation options.

In conclusion, the Westervelt Company has contributed over 600,000 acres of working forest. Our wood products contribute vital carbon storage benefits, and our 30,000-acre mitigation portfolio is part of a broader \$25 billion industry. To continue to grow these efforts, we need your assistance in including the private sector and delivery of publicly-funded restoration projects, and we also need to collaboratively develop streamlined regulations.

Thank you again for conducting this hearing. The Westervelt Company stands ready as a resource to this committee as it ad-

dresses important challenges of climate change and the private—the solutions that private industry can offer. Thank you so much.
[The statement of Ms. Bell follows:]

Written Testimony of Tyler Bell
Director, Rocky Mountain Region, Westervelt Ecological Services
Before the House of Representatives
Select Committee on the Climate Crisis
Hearing on “Building Climate-Resilient Coastal Communities:
Perspectives from Oregon’s State, Local, and Tribal Partners”

August 3, 2022

Chair Castor, Ranking Member Graves, and distinguished Members of the House Select Committee on the Climate Crisis, on behalf of The Westervelt Company, thank you for the opportunity to testify on the role of the private sector in effectively providing resilient, landscape-based ecological solutions.

Introduction

I am the Director of Westervelt Ecological Services’ Rocky Mountain Region located in Golden, Colorado. Westervelt Ecological Services was established in 2006, and is a division of The Westervelt Company, a privately held, family owned and operated business headquartered in Tuscaloosa, Alabama.

Westervelt Ecological Services is dedicated to high-quality, large-scale conservation and restoration projects that protect land and water resources for future generations. Wetland, stream, and species mitigation is our business. Regulatory markets or government programs routinely benefit from our ability to deliver quality restoration solutions, which comprises expertise in land acquisition, restoration planning, and long-term stewardship. Our conservation and mitigation projects include over 30,000 acres, an area slightly larger than the city of Eugene, Oregon. That’s 30,000 acres that were previously vulnerable to development and are now being managed in perpetuity for public and environmental benefits. Development of Westervelt Ecological Services’ restoration portfolio required collaboration with private landowners, businesses, land trust organizations, non-profits, and government entities throughout multiple U.S. regions. Our commitment to responsible land stewardship practices and strong environmental ethics is fundamental to The Westervelt Company.

The Westervelt Company was founded in 1884 and consists of four business units: Westervelt Lumber, Westervelt Forest Resources, Westervelt Ecological Services, and Westervelt New Zealand. As an owner and manager of over 600,000 acres, Westervelt is an industry leader in silvicultural practices and wood products manufacturing. The Westervelt Company is also a leader in environmental stewardship. We are a major landowner and lumber producer that has proactively implemented sustainability on our lands. We have pioneered large and viable mitigation projects through the private funding of Westervelt Ecological Services.

At The Westervelt Company, we believe that sustainability is our responsibility and our legacy. Our commitment to environmental, social, and leadership standards is proven through our voluntary sustainability reporting (*Westervelt’s Sustainability Story*). Westervelt Ecological Services furthers the Westervelt Company’s mission through the restoration and long-term land stewardship of ecological habitats. This is of value and benefit to future generations. The Westervelt Company and Westervelt Ecological Services demonstrate how private sector companies with a commitment to working and restored natural landscapes are vital to national climate resiliency efforts.

We believe large, private landowners, like The Westervelt Company, and private investment should be encouraged to assist in critical restoration efforts. Public funding of lands and government sponsorship of climate resiliency projects is not enough—Congress must incentivize and enlist the expertise, lands, and upfront capital of the private sector to meet the urgency of the climate change challenge.

I am here today to discuss the importance of working forests, wood products, and restored landscapes in climate resiliency, and the benefits of and ways in which you can help private sector mitigation providers access public funding and develop reliable and consistent regulations.

Importance of the Private Sector in Climate Change Initiatives

Working Forests

National forest health contributes to coastal forest health. Climate mitigation from our nation's forests is provided in many ways: forest carbon sequestration and storage; carbon storage in long-lived wood products; protection of stream habitats and regulation of water flows; and protection of coastal communities from extreme events and sea level rise (*Forests Combat Climate Change*). Sustainably managed working forests and the forest products they produce are one of our nation's greatest assets for achieving our climate goals. U.S. forests and forest products offset 15% of U.S. industrial carbon emissions every year.

More than one-third of the United States is covered by forests, and 47 percent of U.S. forests are privately owned working forests, owned by families, businesses, and investors. These forests are sustainably managed to supply a steady, renewable supply of wood for lumber, energy, paper, and packaging found in more than 5,000 items that consumers use every day. They are the source of 2.5 million well-paying, American jobs—mainly in rural communities—and support over \$280 billion in sales and manufacturing.

Approximately 90 percent of the wood and fiber used to make forest products in the U.S. comes from private working forests. At the same time, these forests account for 72 percent of our gross forest carbon sequestration, enough to offset greenhouse gas emissions from all passenger vehicles in the U.S. each year. Private working forests in the U.S. store an additional 82 billion metric tons of CO₂e. That amount is more than all other forest types combined. Westervelt's working forests alone store about 30.4 million metric tons of CO₂e. By providing a continuing cycle of growing, harvesting, and replanting, sustainable forest management optimizes the capacity of private, working forests to sequester and store carbon.

In addition to climate mitigation, there are other important environmental benefits in maintaining working forests. Water supplies for communities around the country come through forested watersheds, where forests act as a natural filtration system for nearly 30 percent of the water we drink. Private, working forests also play an important role in conserving at-risk and declining species. Access to these forests is vital to wildlife conservation, as sixty percent of our nation's at-risk species rely on private forestland for survival. Collaborative conservation efforts, such as the National Alliance of Forest Owners' *Wildlife Conservation Initiative*, benefit species while keeping private working forests intact.

Private forest owners like Westervelt are leading the way in pursuing natural climate solutions. Recently, our CEO joined more than 40 other leading U.S. forest-owning companies, the National Alliance of Forest Owners, The Nature Conservancy, Environmental Defense Fund, American Forests, and the American Forest Foundation to adopt a unique set of *Principles on Private Working Forests as a Natural Climate Solution*. These "CEO Principles" express our common vision for increasing the climate mitigation of sustainably managed private working forests and sustainably produced solid wood products through market and incentive-based approaches.

Wood Products

Because wood is fifty percent stored carbon by weight, long-lived wood products also store vast amounts of carbon. Each year, wood products add an additional 100 million metric tons of carbon to the nearly 10 billion tons of carbon stored in wood products—that's nearly three times the carbon stored in all U.S. national parks combined. Advanced engineered wood products, like mass timber, present an enormous opportunity to lower the carbon footprint in the built environment.

Increased demand for wood in the built environment is another significant climate mitigation opportunity that is as important as forest carbon. Heightened market demand for wood utilization coupled with demand for forest carbon can optimize mitigation outcomes.

The United Nations reported that ten percent of global greenhouse gas emissions come from building construction materials (*UN 2020 Global Status Report*). Advanced engineered wood products, like mass timber, require significantly less energy to produce than alternative building products. Wood used for construction also stores significant amounts of carbon (typically referred to as "embedded carbon") for long periods of time, further expanding the mitigation benefit. With the introduction of mass timber in the nation's preeminent model building code, wood is now approved as a structural material for buildings up to 18 stories tall, a height that encompasses the vast majority of buildings in the U.S.

Sustainably managed, private working forests are more than capable of meeting any additional demand for wood in the built environment. Harvests of any type (timber stand improvement, thinning, final harvest, etc.) occur on only two percent of the total land area of private working forests each year, and we reforest the same land area each year through planting or natural regeneration. *According to the USDA, from 1953 to 2011, in a time of expanding population and increasing demand for homes, paper products, and energy, the total volume of trees grown in the U.S. increased by 50%. Today, private forest owners are growing 43% more wood than they remove.*

Restored Landscapes

Compensatory mitigation is required when there is a permanent impact and loss of wetland or stream habitat. Essentially, mitigation is required to replace the loss of wetland and aquatic resource functions in a watershed. This approach helps to preserve the climate benefits provided by habitats. Wetland restoration requirements are driven by the federal Clean Water Act, Endangered Species Act, or others required by state or local laws. These projects provide water quality, flood control, and wildlife benefits to local watersheds. Westervelt Ecological Services develops these multi-benefit and multi-objective mitigation projects, implemented through sustainable, nature-based solutions and processes. We are the industry leader in providing compensatory mitigation for wetlands, streams, and species when required by state or federal regulatory agencies. The mitigation offsets provided by Westervelt Ecological Services have helped important public infrastructure projects gain approval from regulators, allowing these projects to begin in a timely manner.

Westervelt Ecological Services has private funding to implement these important restoration projects. Our project benefits are multi-faceted and widespread. We have worked directly with State agencies to implement large-scale restoration projects required for a variety of programs. Westervelt Ecological Services has worked extensively in the Sacramento River Delta to identify and fund over 6,000 acres of projects critical to sustain the Delta ecosystem—one of the largest natural estuaries in the Country. We are the selected mitigation provider for the California High-Speed Rail and have assisted the California High-speed Rail Authority in meeting its regulatory obligation for both wetland and species impacts, resulting in implementation of over 4,000 acres of wetland mitigation and conservation. Westervelt is working with key landowners along the Columbia River to help deliver salmon habitat for commitments required for vital public utilities projects.

In multiple instances, Westervelt has worked with local stakeholders and resource agencies on complex mitigation solutions. These include the Big Thompson Confluence Mitigation Bank, established in an area identified as critical for restoration and flood mitigation following the 2013 floods in Colorado; the Big Gun Conservation Bank, established through complex land purchase negotiations and resulting in the perpetual protection of an imperiled California red-legged frog population in the Sierra Nevada Range; and the Cosumnes Floodplain Mitigation Bank, providing floodplain restoration and protection for the benefit of natural systems, neighboring Sacramento County, California communities, aquatic species, and government regulators that rely on our solutions to permit and approve projects.

Government agencies are particularly important in the approval and implementation of these projects. As such, we take pride in efficiently and effectively working with regulatory agencies such as the Environmental Protection Agency, U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and others to achieve ecological successes that have long-lasting, positive effects on natural systems. We are proud to provide environmental mitigation options to help our clients—typically pursuing public infrastructure projects—meet local, State, and Federal environmental compliance requirements on their development needs. In short, we assist community development in an environmentally responsible manner.

In addition to our restoration work, we are working with the U.S. Army Corps of Engineers, Tribal Nations Technical Center of Expertise (TNTCX). We are piloting an effort to connect tribal interests with our restoration sites. Connecting these key stakeholders to land that may be beneficial to their culture is important to us. These are examples of some of the ways in which thoughtful restoration projects can provide environmental, community, and cultural benefits to various public stakeholders.

Access to Public Restoration Dollars & How You Can Help

It is important to note that Westervelt Ecological Services is part of a broader, ecological restoration industry supporting \$25 billion in economic output and an estimated 225,000 jobs (*BenDor et al. 2015*). Westervelt Ecological Services is an ac-

tive and long-standing member of the Ecological Restoration Business Association. This ecological restoration industry, which comprises over 80, primarily private, member companies that deliver resilient, ecological outcomes. Our industry recruits and develops a talented workforce comprising a range of technical and labor skills and good paying, skilled jobs. Allowing private sector participation in public restoration initiatives will result in more efficient and successful restoration projects that create jobs and revenue for the communities in which they occur. It will also develop robust standards in accountability. This is partly because the private sector is accustomed to outcome based and performance-based contracting, where private dollars make the initial investment in the needed solution and the private sponsor company is paid upon proven delivery of the ecological outcome. This model is more beneficial to the public because it stretches use of public dollars in an efficient manner and places risk of ecological success/failure on the private sector.

Creating performance standards for public projects, like how they exist in compensatory mitigation standards, will also result in increased accountability. Performance standards guided by long-term financing, management, and site protection objectives will ensure projects succeed and accomplish landscape goals over time. Site protection typically exists as perpetual conservation easements, guaranteeing that built projects can remain and provide value in perpetuity. These standards are important in assuring sound planning, design, and construction of projects. The private sector ecological restoration industry is acclimated to these standards and builds projects accordingly. As such, private sector projects exist on the landscape well beyond contract closure.

The U.S. Federal Emergency Management Agency and Department of U.S. Housing and Urban Development hazard mitigation programs can also benefit from more private sector involvement and the above financing, management, and site protection standards. Our first line of defense in climate change is our natural systems. These programs and related grants should fully contemplate investment in private sector restoration projects that will bolster natural defenses in the coastal, riparian and floodplain landscapes. This approach will also save taxpayer money over the long run. For every \$1 invested in disaster mitigation—including natural defenses—saves \$6 in disaster aid (*Every \$1 Invested in Disaster Mitigation Saves \$6*).

Privately funded mitigation providers have a proven record of working well with the U.S. government to achieve development goals. To ensure continued progress, it is critical that industry and government work together to develop streamlined regulations. Without efficient permitting for infrastructure, investors withdraw from private mitigation solutions and there are fewer ecological offset options available to regulators and permittees. This slows the permitting of infrastructure projects, increases regulator staff time evaluating individual mitigation plans, and has negative consequences for the environment. Because most mitigation projects require years of planning and capital expenditure upfront, continuous regulatory uncertainty and lengthy rulemaking exacerbate these issues. Working with the government to develop stable policy will offer the regulatory certainty needed for private sector investment in mitigation options, and in turn reduce regulatory confusion and delays in permitting timelines for permittees and mitigation providers.

Regardless of the funding or regulatory mechanisms, landscape-scale restoration is of benefit to the public and in combating climate change. This growing sector has a positive public impact and should have bipartisan support by Congress. With appropriate guardrails, including contracting only qualified private sector sponsors with demonstrated experience, Congress and states can ensure procurement processes involve the private sector. This will allow the private ecological restoration sector to bid and compete for resiliency grants and contract outcomes alongside the traditional public agencies and non-governmental organizations that have historically been awarded this funding. Ultimately, bringing successful, private restoration providers to the table will result in the development of ecologically sound, resilient, and sustainable projects that benefit everyone.

Conclusion

The Westervelt Company has contributed to over 600,000 acres of working forests and over 30,000 acres of restored and conserved lands. Our wood products, derived sustainably from our working forests, contribute vital carbon storage benefits. The Company's extensive conservation and restoration portfolio is a demonstration of our success working with the many stakeholders associated with privately funded landscape-scale efforts. Our mitigation efforts are part of a broader \$25 billion dollar industry, and, with legislative support and federal funding, our industry can restore and protect many more natural lands and resources. To continue to grow these efforts, we your need assistance with appropriate procurement and contracting procedures to ensure we can continue to develop important restoration and conservation

projects. We also need to collaboratively develop streamlined regulations that allow for efficient and effective permitting avenues. Finally, we need to ensure legislation or federal funding (e.g., grant language) does not preclude the private sector from participating in the delivery of restoration or conservation projects.

Thank you again for conducting this hearing. The right climate solutions can enable private forest owners and mitigation providers to invest further in sustainable landscape restoration and management that enhances the quality and abundance of wetlands and streams, ameliorates flood impacts and increase flood storage, creates wildlife and plant habitat, and produces needed jobs for local communities. The Westervelt Company stands ready as a resource to this Committee as it addresses the important challenge of climate change, and the solutions private industry can offer.

Ms. CASTOR. Thank you, Ms. Bell.

Next up, Dr. Chan, you are recognized for five minutes to provide a summary of your testimony. Good morning.

STATEMENT OF DR. FRANCIS CHAN

Dr. CHAN. Thank you, Chair Castor. Thank you, Representatives Carter and Bonamici, for this opportunity to speak to you today about the role of science and partnership in building climate resilient coastal communities.

I am Francis Chan. I am an Associate Professor at Oregon State University, OSU, where I conduct research on ocean chemistry and ecology. I am also the Director of the joint NOAA–OSU Cooperative Institute for Marine Ecosystem and Resource Studies, which was established to enable the two-way flow of expertise between Federal partners and academic scientists.

I have spent two decades studying changes in Oregon’s coastal ocean. This field hearing could not be more timely. Oregon’s coastal communities and industries are really on the front lines of ocean climate change.

If we drive down the coast we can talk with Sue Cudd and Mark Wiegardt, owners of the Whiskey Creek Shellfish Hatchery, about how an acidifying ocean almost put them out of business.

We now have heat waves in the sea that turn a normally productive ocean food web, that has long allowed salmon to thrive, to one where juvenile salmon have trouble finding enough food to survive.

We also know that a warming ocean also gives rise to oxygen-poor hypoxic zones. Along our coast, oxygen levels can drop to concentrations so low that Dungeness crab, our most valuable fishery on the West Coast, can suffocate in the pots of fishermen before they are brought to market.

Just as we have wildlife—wildfire seasons that start earlier and spread farther on land because of climate change, we now have a hypoxia season that returns to our coastal waters each year.

The climate crisis is not a far horizon event for us; it is an everyday challenge for people on the Oregon coast. And along our coast you also find residents—scientists, fishermen, and resource managers—rolling up their sleeves to find solutions to this crisis. Coastal Oregonians are doing this by taking advantage of the best available science, and by working together.

At Whiskey Creek, OSU researchers supplied hatchery managers with state-of-the-art seawater carbon dioxide sensors that have allowed them to stay in business.

Further down the coast, in Newport, you will find NOAA and OSU scientists working side by side with commercial fishermen to

track ocean conditions and the health of juvenile salmon. This information gives us an invaluable look ahead into what the salmon fishery can expect to see when an adult returns, up to four years ahead.

And with NOAA's support, I have been able to work with the blue high-tech industry to develop a cheaper, smarter, and tougher oxygen sensor that crab fishermen put on their crab pots. The sensors plot oxygen levels every time the pot comes on deck, so the fishermen can see if they are working inside or outside of the hypoxic zone. This technology is bicoastal. What we have developed is now in the hands of New England lobstermen, who are tracking hypoxic zones that are rising in their fishing grounds, as well.

We have an opportunity to build on successes like these, and go much farther. At OSU, researchers are working to stimulate a new marine climate insurance industry that could help seafood growers and harvesters be more climate resilient. On land, farmers have accessed insurance products to safeguard their livelihoods against drought and other weather events. For fishermen dealing with increasing marine heat waves or hypoxia, that is not an option, in part because insurers need good science that we don't have in hand to price risk.

This is science that I know we can produce. In my own work I am collaborating with NOAA colleagues to develop tools that can make the Dungeness crab fishery a more climate resilient fishery.

Importantly, we are honored to have representatives from Tribal nations and commercial fishing industry serve on our advisory board, to make sure that we go after the most actionable options. Robust and diverse partnerships like this are the key to ensuring science is pointing in the right direction, and they are connecting the dots between climate ecosystems and smart management.

As an ocean scientist, I am buoyed by Federal attention to ocean-based climate actions. And Oregon's Representative Bonamici is at the forefront of these efforts—thank you. The congressmen recently enacted Coastal Research Act gives us a blueprint for making targeted investments in innovation, but also partnerships in engaging people that are most impacted by the ocean climate crisis to help build solutions.

There is a way forward.

I thank Chair Castor, Representative Carter, and Representative Bonamici for this attention in preparing our coastal communities for challenges ahead. Thank you.

[The statement of Dr. Chan follows:]

Written Testimony of Dr. Francis Chan
Associate Professor, College of Science, Oregon State University

Before the Select Committee on the Climate Crisis
U.S. House of Representatives

**Hearing on "Building Climate-Resilient Coastal Communities:
 Perspectives from Oregon's State, Local, and Tribal Partners"**

August 3, 2022

Thank you Chair Castor, Ranking Member Graves, and Representative Bonamici for this opportunity to speak to you today to discuss the important issue of building climate-resilient communities.

I am Francis Chan. I am an associate professor at Oregon State University where I conduct research on ocean chemistry and ecology. I am also the Director of the Joint NOAA–OSU Cooperative Institute for Marine Ecosystem Studies (CIMERS). This Cooperative Institute, like 14 others around the country, was established to ensure that NOAA can draw on the full breadth of the Nation’s scientific expertise and capacity in managing the ocean.

I have spent two decades studying changes in Oregon’s coastal ocean. This field hearing could not be more timely. Oregon’s coastal communities and industries are on the frontlines of climate change. If we drive down the coast, we can talk with Sue Cudd and Mark Weigardt, owners of the Whiskey Creek Shellfish Hatchery about how an acidifying ocean almost put them out of business. They were put in that situation because carbon dioxide levels in seawater had passed the chemical threshold that’s safe for growing seed oysters (Barton et al. 2012). This is important because oyster farms up and down the coast depend on their seed oysters to support a \$100 million per year oyster industry.

Climate change is also giving rise to increasing frequency and severity of marine heatwaves (Oliver et al. 2018). Marine heatwaves are periods of abnormally high ocean temperature. One of the largest marine heatwaves on record landed on our shores in 2014. Marine heatwaves are an important concern because they turn the normally productive ocean food web that allows salmon to thrive into one where juvenile salmon have trouble finding enough food to survive (Daly et al. 2015).

Further, we also now know that a warming ocean also gives rise to oxygen-poor (or hypoxic) zones. This is because warmer waters hold less dissolved oxygen and warmer waters on the surface of the ocean act to slow the replenishment of oxygen from the atmosphere to the deep ocean (Keeling et al. 2010). Along the Oregon coast, ocean conditions are also affected by changes in winds that drive upwelling ocean currents that pull deep, oxygen-poor but nutrient-rich waters to a productive, shallow continental shelf. Stronger winds from climate change accentuate the risk and severity of low oxygen events (Bakun et al 2015).

Along the Oregon coast, oxygen levels can drop, as it is right now, to levels so low that Dungeness crabs, the most valuable fishery on the west coast, can suffocate in the pots of fishermen before they can be brought to market (Grantham et al. 2004). Just as we have wildfire seasons that start earlier and spread farther on land because of climate change, we now have a low oxygen (or hypoxia) season that returns to our coastal waters each year. The low oxygen zones that we experience today are more severe and closer to shore than what can be seen in historical records that go back seven decades (Chan et al. 2008, Figure 1). Just last year, a hypoxic zone developed off Oregon’s central coast in April and persisted for six months. But unlike wildfires, hypoxia is not something that can be seen. A fisherman cannot tell from the surface if he or she is about to drop crab pots into a hypoxic zone. In addition, because observations of dissolved oxygen values near the sea floor are limited, a fisherman can’t tell how far she or he should move to get away from a hypoxic zone. The climate crisis is not a far horizon event, it is an everyday challenge for people working our coastal waters.

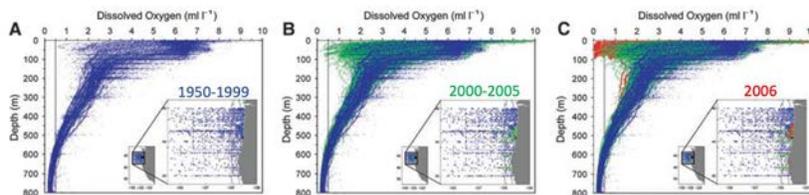


Figure 1. Dissolved oxygen measurements along the Oregon coast, A) from the first five decades of oceanographic observations, B) increasing severity of hypoxia (vertical dash line denotes 0.5 ml l⁻¹, C) first documented observation of nearshore anoxia (zero oxygen). Figure from Chan et al. 2006)

Along the Oregon coast, you will also find local residents, scientists, fishermen, and resource managers rolling up their sleeves to find solutions to this crisis. They are doing this by taking advantage of the best available science and by working together. At Whiskey Creek, OSU researchers supplied hatchery managers with state-of-the-art seawater carbon dioxide sensors that have allowed them to stay in business. In Oregon’s marine reserves, coastal residents are a working part of citizen scientist teams that are using research-grade pH sensors to identify hotspots and

refuges from ocean acidification (Figure 2). Down the coast in Newport, you'll find scientists from OSU and NOAA's Northwest Fishery Science Center working side by side with commercial fishermen to track ocean conditions and the health of juvenile salmon (<https://www.fisheries.noaa.gov/west-coast/science-data/ocean-ecosystem-indicators-pacific-salmon-marine-survival-northern>). This information requires sustained, long-term support but gives fishermen and fishery managers an invaluable look ahead into what the salmon fishery can expect to see in adult returns up to 4 years out.



Figure 2. Examples of citizen scientists using Oregon's Marine Reserves as sentinel sites for ocean acidification monitoring. From Chan et al. 2019.

In my own work, with support from NOAA's National Centers for Coastal Ocean Science, I've been able to collaborate with the blue high-tech industry to develop a cheaper, smarter, and tougher oxygen sensor that crab fishermen put onto their pots (Stoltz et al. 2021, Figure 3). The sensors plot oxygen levels every time the pot comes on deck so fishermen can now see if they are working inside a hypoxic zone. For researchers, this partnership has meant an order of magnitude increase in the number of critical measures that we have for detecting and tracking the progression of hypoxic zones in Oregon. The technology that we've developed is now in the hands of lobstermen in New England who are dealing with the rise of hypoxia in their traditional fishing grounds (Figure 4).



Figure 3. Commercial crabber bringing on deck a crab pot equipped with a smart dissolved oxygen sensor (red arrow) developed with support from NOAA NCCOS' Coastal Hypoxia Research Program. (Photo credit: Pat Kemmish, *F/V Richard H.*)

The examples that I've shared came about from wise federal investments in innovations and partnerships. We have an opportunity to go much farther. In CIMERS, OSU and NOAA scientists are working on the intersection between new ocean acoustic technologies and artificial intelligence. The sounds captured by NOAA's Ocean Noise Reference Network (<https://www.pmel.noaa.gov/acoustics/noaanps-ocean-noise-reference-station-network>) have varied uses including tracking climate change impacts on sea ice, monitoring the impacts of renewable energy projects, and delineating crucial habitats for marine mammals. By developing new acoustic technologies, including the use of autonomous underwater vehicles and new ways to automate analyses through artificial intelligence, ocean sound monitoring has the potential to cost-effectively provide the information needed to guide the management of multiple ocean priorities such as fishing, marine renewable energy, and protection of marine life.

Working at a public university, I also see firsthand the value proposition of a blue high-tech economy. Investing in innovations is investing in workforce development. A student that is inspired to blend artificial intelligence with sensors that survive the bottom of the ocean or the inside of a commercial crab pot will have the kinds of creative, technical problem-solving skills that are vital to our economy. There is much work to do and we need to make sure that inquisitive and creative students from economically challenged communities, be it the coast, the inner-city of Port-

land, or the high desert are not left behind. We need to make sure that they have access to opportunities that give them an on-ramp to the growing blue economy.

Innovations also take the form of new ideas. At OSU, researchers are working to stimulate a new marine climate insurance industry that would help seafood growers and harvesters be more climate-resilient. On land, farmers have access to insurance products to safeguard their livelihoods against drought and weather events. For fishermen dealing with increasing marine heatwaves or hypoxia, that's not an option. This is due in part to a lack of access to scientific information, such as the frequency and severity of events that would allow insurers to adequately price risk. Some of this information is already in hand and some will require further research, but this is the kind of blue economy opportunity that NOAA's vision for climate products and services can catalyze. Importantly, a marine climate insurance industry would give seafood growers and harvesters a tool to adapt to the uncertainties that continued climate change will bring.



Figure 4. Dissolved oxygen sensor (lower red arrow) and deck display (upper red arrow) being used by New England lobstermen to track the onset of hypoxia on the East Coast (Photo credit: Lowell Instruments)

Partnerships are key to our success and help us point science in the right direction. I am working with NOAA colleagues to develop tools that can make the Dungeness crab fishery a more climate resilient fishery. This effort draws on expertise from researchers in NOAA's Pacific Marine Environmental Laboratory, Northwest Fishery Science Center and NCCOS and public universities to link together our best knowledge and tools in ocean climate and fishery observations and modeling. Importantly, we are honored to have representatives from Tribal nations and the commercial fishing industry serve on our advisory board to make sure that we go after the most actionable options.

Further, connecting the dots between climate, ecosystems, and wise management is fundamental and crucial. A good example of a collaborative and multi-disciplinary initiative is NOAA's Climate, Ecosystem and Fisheries Initiative that allows federal and university scientists to build an operational ocean modeling and decision support system that is needed to reduce impacts, increase resilience, and help marine resources and resource users adapt to changing ocean conditions (<https://www.fisheries.noaa.gov/resource/document/noaa-climate-ecosystems-and-fisheries-initiative-fact-sheet>).

Finally, I've seen firsthand the potential for sound science to guide how we prepare for a changing ocean. I previously co-chaired the West Coast Ocean Acidification and Hypoxia Science Panel (<https://westcoastoah.org/westcoastpanel/>). On this panel, 20 leading scientists from across the west coast lent their expert advice to

provide science-informed recommendations to inform state actions including new legislation in Oregon:

(SB 1039, <https://olis.oregonlegislature.gov/liz/2017R1/Measures/Overview/SB1039>; HB 3114, <https://olis.oregonlegislature.gov/liz/2021R1/Measures/Overview/HB3114>); and California: (SB 1363, http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_1351-1400/sb_1363_cfa_20160818_010548_asm_floor.html; AB 2139, http://www.leginfo.ca.gov/pub/15-16/bill/asm/ab_2101-2150/ab_2139_bill_20160914_chaptered.htm).

I am buoyed by federal attention to the challenges that coastal communities face from a changing ocean climate. And Oregon's Representative Bonamici is at the forefront of these efforts. The Congresswoman's recently enacted Coastal and Ocean Acidification Research and Innovation Act gives us a blueprint for targeted investments in ocean research, innovations, and engaging people most impacted by the ocean climate crisis to build solutions. There is a way forward.

Thank you Chair Castor, Representative Bonamici, Ranking Member Graves and this panel for your attention to preparing our coastal communities for the challenges ahead.

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Ms. CASTOR. Thank you, Dr. Chan.

Next, Dr. Placido, good morning. You are recognized for five minutes.

STATEMENT OF DR. ELAINE PLACIDO

Dr. PLACIDO. Good morning, Chair Castor, Representative Carter, Representative Bonamici, Thank you so much for the opportunity to share our climate resilience efforts in the lower Columbia.

I am Elaine Placido. And as the Executive Director of the Lower Columbia Estuary Partnership, I work daily to make real our mission to restore and care for the waters and ecosystems of the lower Columbia River for current and future generations of fish, wildlife, and people.

Over the last 27 years, we have completed a wide variety of programming and projects that improve habitat, foster stewardship, pro-

vide objective scientific information, and facilitate consensus to protect the lower Columbia River estuary.

The Columbia River estuary stretches 146 miles, from the Bonneville Dam out the mouth of the river. The Columbia is a working river that is home to nearly three million people in the lower Columbia region. The estuary is also of critical importance to tribal, recreational, and commercial fishers. When Buoy 10 fishing season opens, you can practically walk across the river not on the backs of salmon, as legends once told, but from boat to boat, as fishers from all around the globe cast their line.

The estuary has seen significant impacts from climate change, dams, and land development. Currently, in the estuary we have documented a stretch of 57 miles where summertime temperatures and a lack of cold water refuge could make the river—the trip upriver lethal, particularly for summer steelhead and fall chinook.

We are integrating climate adaptation into our restoration work by taking actions such as using setback levees to open wetland habitat, while protecting human infrastructure; building bigger bridges and culverts to accommodate sea level rise and higher flows to more frequent, intense storms; and integrating living shorelines and nature-based solutions to protect increased—to protect against increased flooding; changing our native plant species mixes to integrate plants that might do better with longer, drier summers; and identifying pockets of cold water that serve as thermal refuge.

We are also actively using climate mitigation to shape our work. One of our primary Bipartisan Infrastructure Law projects is to complete an inventory of carbon and methane fluxes in tidal wetlands, and help to quantify the impact restoring these wetlands may play in sequestering carbon as a nature-based solution for offsetting greenhouse gases.

The connection between our salmon and climate resiliency is this: what is good for our salmon is good for our communities.

Right now, life is tough for salmon in the Columbia River Basin. The solution? Restore habitat and create cold water refuges. We are in the final stages of the largest restoration project in the lower Columbia, recent—restoring nearly 1,000 acres of floodplain.

In restoring the Steigerwald Lake National Wildlife Refuge, we reconnected a floodplain to the Columbia, decreased flood risk to important public infrastructure, opened hundreds of acres of fish and wildlife habitat, and increased the recreational amenities available to the public by nearly doubling the stretch of trails through the refuge.

We also incorporated climate mitigation into this project by identifying the carbon impact of our own restoration work and creating a plan to offset those carbon emissions with increases in planting. This is a huge win for salmon, with increases in the quality and quantity of habitat, but also for people who enjoy the recreational opportunities of this urban wildlife refuge, and who now have increased flood protection.

We have identified more areas on the lower Columbia that can be restored to provide flood resilience for people and habitat and cold water refuge for salmon. With the significant investments in

the National Estuary Program in recent years, we have the support to begin to develop these projects.

Monitoring is also foundational work. It is the most challenging to secure funding for, making our—the Federal investment so very important. Thanks to the unprecedented funding for National Estuary Programs in the BIL, we intend to expand our research, mapping, and monitoring efforts. With BIL support we will undertake a multi-year assessment of carbon sequestration potential in the estuary. This information can be used by policymakers to better understand and identify habitat for conservation and restoration.

The other action I want to highlight today is environmental education: expanding the knowledge and experiences of current residents and next—and the next generation of decisionmakers. The Estuary Partnership works with students providing classroom lessons, field trips, and on-water paddling programs that teach students about watershed health, water quality, stormwater, native plants, and other ecology topics. We also work with students, teachers, parents, and community volunteers to coordinate the planting of more than 10,000 riparian trees and shrubs each year.

We know from our assessments that our work makes an impact on matters related to students' knowledge of and their interest in nature.

The Estuary Partnership will continue to partner with communities, organizations, and individuals to restore and care for the Columbia River estuary. The estuary is rich with diverse habitat and communities. We strive to do the work that increases the resilience of the estuary and the people who depend on it for water, food, recreation, and spiritual connection.

Thank you to the Select Committee for making this visit to the lower Columbia, and for your support of policy and funding that will positively impact our work in the Columbia's estuary, as well as estuaries across the country.

Thank you very much for this opportunity to testify.

[The statement of Dr. Placido follows:]

**Written Testimony of Dr. Elaine Placido
Executive Director of the Lower Columbia Estuary Partnership**

To the House Select Committee on the Climate Crisis

I am honored to share our climate resilience efforts in the lower Columbia. The Lower Columbia Estuary Partnership is currently in its 27th year as a National Estuary Program, one of 28 in the nation that recognizes designated estuaries of national significance. Our mission at the Estuary Partnership is *to restore and care for the waters and ecosystems of the Lower Columbia River, for current and future generations of fish, wildlife, and people*. To that end, we complete a wide variety of programming and projects that foster stewardship, provide objective scientific information, and facilitate consensus to protect the lower Columbia River and estuary. Along with our partners, we work to restore habitat while advancing science, improving river conditions while expanding our knowledge of the estuary, and increasing the knowledge and experience of the next generation of decision makers.

As with our fellow National Estuary Programs we appreciate the bipartisan support and leadership from members of Congress, including the work of the Congressional Estuary Caucus; thank you to Congresswoman Bonamici and Congressman Jared Huffman, two members who sit on the select committee as well. It is also important to recognize the critical and very real benefits that will be made throughout the basin by the significant investments made in the National Estuary Programs, geographic programs, and communities by the Bipartisan Infrastructure Law (BIL).

The lower Columbia River estuary stretches 146 miles from the Bonneville Dam to the mouth of the river. The Columbia is a working river, home to over eight million people in the four-state basin and nearly three million in the lower Columbia region. The Columbia River system is number one in the US for wheat exports, and number one on the west coast for wood, mineral, and auto exports.

The estuary is also of critical importance to Tribal, recreational, and commercial fishers. When Buoy 10 fishing season opens, you can practically walk across the river—not on the backs of salmon as the legend of historic salmon runs once told—but from boat to boat as fishers from all around the globe cast their line and are welcomed into the history of people who since time immemorial, have relied on a healthy Columbia River ecosystem. The river is not only an important economic driver but also home to wildlife, fish, and the people who rely on them for sustenance and recreation. Unfortunately, there are now thirty-two species of plants, fish, and wildlife living in the Columbia basin that are listed under the Endangered Species Act, including 13 species of salmon and steelhead. Where the river used to see an estimated 8 to 16 million wild salmonids returning annually, we now see fewer than 1 million returning for the annual migration up the Columbia River System.

The estuary has seen significant changes from dams, land development, diking, and a warming climate. Waterflow, thermal changes, and development along the river have resulted in one of our biggest challenges—lack of cold water refuge. Currently in the estuary, we have documented a stretch of 57 miles, from the mouth of the Lewis River to Eagle Creek, where summertime temperatures and a lack of cold water refuge could make the trip upriver lethal, particularly for steelhead and fall Chinook. We are working on multiple ways of integrating climate adaptation and mitigation into our work.

Integrating Climate Adaptation means adapting to the effects of climate change in our restoration projects, including using set-back levees, bigger bridges and culverts to accommodate sea level rise and higher flows from more frequent, intense storms; integrating living shorelines and nature-based solutions for increased flooding from these impacts; changing our native plant species mixes to integrate plants that might do better with longer, drier summers; and identifying pockets of cold water that could serve as thermal refuges to protect or restore. We currently are working on a pilot project on the mainstem Columbia that would fill that 57-mile spatial gap in thermal refuges between the Lewis River and Eagle Creek.

We are also actively considering Climate Mitigation (i.e., reducing greenhouse gases, sequestering carbon). One of our primarily BIL projects will complete an inventory of carbon and methane fluxes in tidal wetlands and help to quantify the impact restoring these wetlands can play in sequestering carbon. On our Steigerwald Restoration Project, we worked to identify the impact of our restoration work and created a plan to offset carbon releases from our restoration construction phases by increases in planting.ⁱ

The connection between our salmon and climate resiliency is this: what is good for our salmon is good for our communities.ⁱⁱ Life is tough for salmon in the Columbia River basin. As juveniles, there are very few suitable places to rest, eat, and grow strong as they travel down the Columbia River to the ocean. Returning adult salmon face challenges of their own: the river is so warm that it can be lethal to adult salmon returning to spawn.

The solution? Restore habitat and create cold water refuge. We are in the final stages of the largest restoration project in the lower Columbia, restoring nearly 1,000 acres of floodplain and reconnecting it to the river. In restoring the Steigerwald Lake National Wildlife Refuge,ⁱⁱⁱ we were able to reconnect a floodplain to the Columbia, decrease flood risk to important public infrastructure and the Port of Camas-Washougal, open hundreds of acres of fish and wildlife habitat, and increase the recreational amenities available to the public by nearly doubling the stretch of trails through and around the refuge. We were also able to continue important educational partnerships with local schools, bringing students to the refuge to learn about science firsthand. As the project is completed and we move into the future, we will be able to collect important data to identify environmental changes at the refuge, and using an installed monitoring system, we will be able to see how tagged fish move into and through the expanded channels of the refuge. And in the years to come, thanks again to the funding from the BIL, we will undertake a series of stormwater and riparian restoration projects upstream of the refuge that will improve water quality and reduce toxics from stormwater runoff, benefitting the long-term health of the refuge and the significant investment in restoration made there. This is a huge win for salmon, with increases in the quality and quantity of habitat, but also for people who enjoy the recreational opportunities of this urban wildlife refuge and who have increased flood protection.

We have identified many more areas on the lower Columbia that can be restored to provide flood resilience for people, and habitat and cold water refuge for salmon. With the significant investments in the National Estuary Program in recent years, we have the support to begin to develop those projects, work with local communities, and make real strides in water quality, habitat improvement, and increasing our understanding of the estuary.

Key to understanding the estuary is our monitoring work and the rich, publicly available mapping we have completed. The Estuary Partnership's monitoring team focuses on ecosystem monitoring, watershed evaluation, and action effectiveness monitoring—studying how sites that have undergone habitat restoration fare over time. Our monitoring program works to establish important baseline data about a range of water quality, habitat, and ecosystems in the estuary. We can complete and present, for the public and researchers, data about the river, such as the analysis of cold water refuges, mapping of potential sea level rise, and land cover data sets.^{iv} This data is critical for communities and local policymakers as they take steps to improve watershed health. Last summer the Monitoring Team completed their fifth year of water quality monitoring in the local watersheds of Columbia County, Oregon, where increasing urbanization and agriculture are creating challenges for temperature and water quality. Their work in Columbia County, supported by the Oregon Watershed Enhancement Board (OWEB), with a partnership with the local Columbia Soil and Water Conservation District, the Lower Columbia River Watershed Council, and the Scappoose Bay Watershed Council to evaluate usability and increase watershed health. That work in Columbia County will result in a suite of steps to improve water quality for communities and the fish who use those watersheds, ranging from simple steps like placing signage to warn residents of potentially high concentrations of *E. coli* to more ambitious projects to increase riparian buffers to reduce turbidity and stream temperature.

Monitoring is foundational work, helping us to improve river conditions as we learn more. It is also the most challenging for which to secure consistent funding. Thanks to the unprecedented funding for National Estuary Programs in the Bipartisan Infrastructure Law, we intend to expand our research, mapping, and monitoring efforts. In late 2022, we will update our regional landcover data set, which identifies the types of habitats and land cover throughout the lower Columbia River. This update will be necessary for a multi-year assessment of carbon sequestration potential in the estuary. Working with our partners at Oregon Health and Science University (OHSU), we will place monitoring equipment that can capture and quantify methane and carbon release, giving us an accurate picture of what types of wetlands and habitats are sequestering carbon and where methane is being released. This information can be used by policymakers to better understand and identify habitats for conservation or restoration in the face of climate change.

Monitoring and research help us to create maps that are available to local communities, decision makers, and the public.^v Through our reference site studies and ongoing monitoring, we know how undisturbed wetlands in the estuary are faring in the face of climate change. We were able to quantify the loss of habitat over the last 130 years of development in the region and use that data to identify restoration targets. And we completed analyses and mapping to predict sea level rise in the estuary that are used by people and communities throughout the region.

The other action I want to highlight is environmental education, expanding the knowledge and experiences of current residents and the next generation of decision makers.^{vi} The Estuary Partnership works with approximately 4,000 students each year—providing classroom lessons and field trips that teach students about watershed health, water quality, stormwater, native plants, and other ecology topics. While none of these classroom lessons focus explicitly on climate change, educators weave climate change impacts and education through each lesson. Perhaps more importantly, however, is the fundamental ecological knowledge base that this education creates for students. We know that many students spend less time learning and exploring outside than previous generations. We also hear from teachers that they lack adequate time to teach science due to the emphasis on math and language skills. This is why our free programs are so important—introducing kids to their watershed; how plants, animals, and humans rely on it; how our changing climate is affecting it; and how their actions can make a difference.

We also work with students, teachers, parents, and community volunteers to coordinate the planting of more than 10,000 riparian trees and shrubs each year. These trees and shrubs grow to shade local streams and rivers, helping to mitigate the impacts of increasing air temperatures. They will also eventually reconnect these streams with their floodplains, increasing groundwater recharge, and as they grow, they will capture and store carbon. Engaging students and communities in

tree planting projects help to connect people to their local environment and provides education around the importance of tree planting for climate resilience.

Each year we work with 35–40 or more schools. Our own learning from these interactions is important, and our most recent student assessment report was completed for the 2019–20 school year. We saw a statistically significant difference in the average score from pre-program to post-program, indicating that students' knowledge improved significantly after the environmental education program they completed with us. Students were asked to respond to a measure to assess their attitudes toward nature and the environment both before and after the program. The students' attitudes improved over time, and there was a statistically significant increase in the average attitude total score from pre-program to post-program.

As the Estuary Partnership director and a parent, I was concerned about the impacts on education that our students would suffer from the pandemic. The environmental educators at the Estuary Partnership, like educators across the country, had to get creative and create new ways to engage students. Our environmental educators dug deep into principles of place-based education, creating lessons that students could engage with alongside their families in local watersheds, such as nature scavenger hunts and nature hike maps. They also created take-home science kits such as the extremely popular owl pellet dissection kits. All their materials were made available to everyone, free of charge, on our website.^{vii} And as the pandemic restrictions began to ease, they began to create ways to engage students in person outdoors—including fish dissection classes and field trips.

Our education program has two unique tools—two 27-foot canoes: we use these to take students, community members, partners, and policy makers out to see the estuary from on the water, deepening their understanding of and connection to the river. Through community partnership programs, we are currently working with 34 partner groups for paddle programs and restoration projects. In 2021, as students were struggling during their second school year impacted by the COVID pandemic, our educators took a group of summer school students from Rainier on a paddle on the mainstem from Goble Landing to Rainier. For all the students, it was the first time they had seen their community from the river, even though they all live within just a few miles of it. Not only was it, as one student said, “the best part of summer school,” it was an opportunity to paddle and connect with the Columbia, get away from the classroom and computer screen, and learn firsthand why clean water and a healthy Columbia River are so important.

Over the last twenty-seven years, the Estuary Partnership has been partnering with communities, Tribes, agencies, organizations, and individuals, to restore and care for the Columbia River estuary.^{viii} The estuary is 146 miles of diverse habitat and communities—we strive to do the work that increases the resilience of the estuary and the people who depend on it for water, food, recreation, and spiritual connection. Thank you to the Select Committee for making this visit to the lower Columbia and for your support of policy and funding that will positively impact our work in the Columbia's estuary as well as estuaries across the country.

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ⁱ <https://www.estuarypartnership.org/sites/default/files/2022-08/Carbon%20Sequestration%20at%20Steigerwald%20Lake%20National%20Wildlife%20Refuge.pdf>

ⁱⁱ <https://www.estuarypartnership.org/our-work/research/climate-resiliency>

ⁱⁱⁱ <https://www.estuarypartnership.org/our-work/habitat-restoration/steigerwald-reconnection-project>

^{iv} <https://www.estuarypartnership.org/our-work/monitoring>

^v <https://www.estuarypartnership.org/our-work/monitoring/habitat-mapping>

^{vi} <https://www.estuarypartnership.org/our-work/education-programs>

^{vii} <https://www.estuarypartnership.org/our-work/education-program/teacher-resources>

^{viii} <https://www.estuarypartnership.org/who-we-are/mission-accomplishments>

Ms. CASTOR. Thank you, Dr. Placido, and thank you to all of our witnesses for your very compelling testimony.

Now we are going to move to member questions. We are going to have two rounds of questions. Each member will get at least five minutes. I will be generous, as well. And today we are going to start with Congresswoman Bonamici.

You are recognized for five minutes.

Ms. BONAMICI. Thank you so much, Chair Castor. And I am going to start with ocean acidification and hypoxia, those environmental stressors that are compromising ocean health and endangering our marine ecosystems and coastal communities and fisheries.

So, Dr. Chan, I want to follow up on the kind comment about the bipartisan work I have done on ocean acidification. In this new legislation that just passed—it is on its way to the President for signature—the bill basically strengthens investments in ocean acidification research and monitoring, but it also establishes the advisory board to increase coordination among stakeholders, and designates NOAA as the lead Federal agency responsible for implementing the Federal response to acidification.

And I do want to recognize the partner we have with NOAA, especially with Dr. Spinrad from Oregon State, as our NOAA administrator. You mentioned the NOAA–OSU partnership. It is strong. I know that.

So, Dr. Chan, how will these new policies in this bill and the increased funding for research and development support your work in that partnership, and build climate resiliency on our coastline?

Dr. CHAN. Thank you for this question. I think it affects us in a number of ways.

One is that it is about expertise. The first Federal investment in ocean space research, that really allowed a generation of new scientists that—biologists that didn't have the chemistry understanding. I—we didn't have [inaudible] scientists that really could combine biology and chemistry of ocean acidification very well. Now we have hundreds in this country. We are—we lead the world in that capacity. So incredible capacity building in just a generation.

But I think that it is also about—you know, we have got a lot of challenges of OA, hypoxia, and climate—other aspects of climate change. But it is also an incredible opportunity in that—we talked about the need to make—for climate—more climate resilient fisheries, but we are also looking ahead to how we can integrate moving renewable energy into this portfolio of things that we are going to get out—we are going to do in the ocean.

We are also thinking about how to do marine carbon dioxide removal. How can we tap into that potential of the ocean?

This is going to take a lot of new skills. We need problem solvers, innovators. Who are going to be the problem solvers and innovators? In my university I look at students who want to go into science because they love science, but I also have students who are on the sidelines, but they really want to solve problems.

And I think these problems solvers are going to be students who really know the value of education. They might be first-generation college students. They might be students that are—they could see that they have been most vulnerable, most affected by climate change. And they are also second-career students, veterans that are coming back to the workforce and looking for new challenges. I think these are the new solution builders. So I thank you for investing in people.

Ms. BONAMICI. That is very exciting. And Dr. Chan, with your leadership, you mentioned, you know, Oregon really is on the front lines. Are you getting inquiries from other researchers around the

country and around the globe on the work that OSU and NOAA are doing on ocean acidification?

Dr. CHAN. Absolutely. We are ground zero, which is a bad place to be. But I think we are also ground zero for innovation.

And that example of the partnership with fishermen that I described, there is so much more that we can do. On a good year I might spend 30 days at sea. That is, you know, my dream year. But fishermen that are on the coast, they spend 150, 200, 250 days at sea. They can describe—they can—they see things that I will never see. And they can go to places that will deploy sensors that I will never get to. So we want to work with those partners.

And people are—like the West—East Coast are asking for help. How do we do that more? How do we tap into that potential partnership?

Ms. BONAMICI. That is exciting. Thank you.

Dr. Placido, as the Co-Chair of the House Estuary Caucus, I know that the needs of our nation's estuaries are often overlooked and undervalued. Thank you for your testimony.

But estuaries are among the world's most productive working ecosystems. According to NOAA, estuaries generate an estimated \$12 billion in revenue each year from tourism and local economies.

So we have, as you discussed in your testimony, as well, these ongoing challenges with acidification, harmful algal blooms, extreme weather events.

So you talked about the largest—in your written testimony, the largest restoration project in the lower Columbia at the Steigerwald Lake National Wildlife Refuge. I had the honor of taking part in the groundbreaking for the restoration project. I am interested in hearing about that project, how it is going to benefit—how it is benefiting wildlife habitat and public infrastructure.

And more generally, what—how can estuaries help mitigate and adapt to the climate crisis?

Dr. PLACIDO. Oh, thank you for the question, Representative Bonamici.

It—the Steigerwald Lake National Wildlife Refuge is a fantastic project. As I mentioned in my testimony, it is 1,000 acres of reconnected floodplain to the Columbia River. We wrapped up the majority of our construction late last summer, and over the winter and early this spring we got to see in action how it is working. There is a couple of different kinds of flooding that we are dealing with.

One is coming down the Gibbons Creek watershed, and that is surface water flooding. We had a 10-year rain event over the winter, right after construction wrapped up, and we were able to see the water fill that new alluvial fan and flood that floodplain the way that it is intended, rather than flooding the homes and costing the Port of Camas-Washougal a significant amount of money to pump that water from behind the levees.

Earlier this spring—actually, in mid-June, so not that long ago—we had a—our spring freshet, and we saw about a five-year flood event on the Columbia. We saw the water from the Columbia come in to the refuge as intended, and flood about 600 acres of that 1,000-acre floodplain. It worked exactly as designed. Really interesting to see the project work like that so quickly.

A couple other interesting points. We were able to elevate—work with WashDOT and elevate the state highway there. All of the flood risks for homeowners and commercial interests in the area have decreased. We were able to decrease the flood risk for some public infrastructure, including a stormwater treatment. We removed some setback levees along the river to expand that floodplain, created some expanded habitat areas for fish and wildlife. The actions of creating those, and bringing—correcting the hydrology in the site, there is a—we were able to remove some of the invasive species. And seeing that happen so quickly has been really phenomenal.

Ms. BONAMICI. That is great. Congratulations.

I think my time has expired.

Ms. CASTOR. Yes.

Ms. BONAMICI. Okay, I yield back.

Ms. CASTOR. Next we will go to Representative Carter.

You are recognized for five minutes.

Mr. CARTER. Thank you, Madam Chair, and thank all of you for being here and taking time out for this. It is very important.

Ms. Bell, I especially want to thank you for being here, because I am really glad to hear that the private sector is recognizing this, and is involved in this, and that is climate change. Because we are—in the Federal Government we are not going to be able to solve this problem without help from the—and buy-in, if you will—from the private sector.

As I am sure you are aware—some of my colleagues may be surprised to learn this, but Georgia is the number one forestry state in the nation. That is right, 22 million acres of commercially available forestland. And that land serves multiple purposes, as you described in your testimony, Ms. Bell. It includes economic benefits, it provides jobs, valued products to our economy, particularly to rural areas.

There are also the ecological benefits. The forests serve as carbon sinks, and habitats, and natural water filters, all of that.

And when most people think of preserved land, though, I think they think of Federal national parks or wildlife refuge, and other federally protected land. But that is not necessarily the case. Most people aren't thinking of the 30,000 acres of restored and conserved land that you have worked on.

Can you go into some more detail as to what the benefits private companies bring to conserving and restoring land, rather than through the Federal Government?

Ms. BELL. Yes, absolutely. So private sector funding is able to provide capital up front for projects, really invest a lot, put those projects on the ground, and ensure their success. And with that ensured success, payment comes through mitigation credits, compensatory mitigations, and other ecological desired outcomes.

And particularly, the private sector holds themselves to standards that really were developed in conjunction with the Army Corps of Engineers and other Federal and state agencies that allow and create a standard for accountability, that being that there are performance-based metrics and outcomes that are required.

And Dr. Placido kind of hit on this, that, you know, we do need monitoring. We need to make sure that those projects that are put

on the ground do perform as they are planned, and do provide the ecosystem services that we have planned for, and that the climate and that the—you know, the landscape requires and needs. And so the private sector is really able to work on those types of milestone-based projects and invest the capital in that.

And there is a big incentive, which is payback. And the private sector has a lot of capital to invest in those types of projects.

Mr. CARTER. Absolutely. And as you pointed out, your work actually complements the missions of regulatory agencies like EPA, and the Corps of Engineers, and others.

Let me ask you. This particular meeting—we are concentrating on coastal resiliency, and that is extremely important. But a lot of your—of Westervelt's projects are located outside of the coastal zone. How do inland restored landscapes and working systems contribute to coastal resiliency?

Ms. BELL. Yes. I mean, the—I think the saying that we all live downstream is pretty important. You know, the headwater systems do have a lot of value to coastal communities. And national forest health is really coastal forest health. Thirty percent of drinking water flows through working forests, and forests provide protection of streams and wetlands and other valuable ecosystems that are inland that ultimately contribute to national health.

And not to mention the wildlife benefits. We have anadromous, catadromous species that go more inland. And protecting those ecosystems for coastal fisheries can tie into that overall national health, as well.

Mr. CARTER. We all know that forests are critical to solving the climate crisis. I always like to say trees are the answer. Trees are the answer.

One of my favorite sayings—and you see it all throughout South Georgia—you drive through South Georgia and you will see a sign that says, “When you breathe fresh air, get down on your knees and thank the farmer who planted the trees.” And it is true. They serve as carbon sinks.

So how exactly do the private working forests contribute and compare to other forest types?

Ms. BELL. Yes. So, well, private working forests have different sustainability certifications, such as the Sustainable Forest Initiative that really hold them to standards. And, you know, there are skilled foresters and hydrologists and wildlife biologists that work on private working forests that ensure that they are functioning well for the ecological needs of the landscape.

But also, you know, I pointed out earlier that working private forests absorb 15 percent of U.S. industrial carbon emissions every year and, you know, that they also store an additional 82 billion metric tons of CO₂ equivalent. And Westervelt's forests alone have 30.4 million metric tons of CO₂ equivalent stored within the—in terms of carbon sequestration.

Mr. CARTER. Okay. Well, thank you.

And we are going to get another round?

Ms. CASTOR. Yes.

Mr. CARTER. Because I have got some very important questions.

Ms. CASTOR. Great.

Mr. CARTER. Thank you. I yield back. Thank you.

Ms. CASTOR. Thank you. Well, I will recognize myself for five minutes for questions.

One of the takeaways from our few days here in Oregon that can be a model for other communities across the country are the collaborations and partnerships that we have seen in action.

When we were in Portland yesterday at Electric Island you had Daimler, a big truck manufacturer, there; with PGE, the electric utility; with the school district, Beaverton School District; with TriNet; community colleges looking at workforce. Then we went over to the port, and they have a very innovative partnership going on to address the affordable housing crisis and the unhoused by—through mass timber, cross laminated timber; working with the Hacienda Corporation to develop communities; OSU, University of Oregon scientists; again, the private sector in forestry trying to solve a problem and help reduce carbon pollution and greenhouse gases all at the same time.

And it seems like you have some of the same things going on here in the lower Columbia River Basin with a lot of challenges, whether it is salmon or Dungeness crab.

You really struck me, Dr. Chan, by calling it heat waves in the sea. And we know these hypoxic zones are just devastating to marine life, and then they have significant economic consequences, as well.

So I want to ask all of you. Highlight for us how your Federal partners can be helpful moving forward. Or, if you want to highlight some investments in the Bipartisan Infrastructure Law, give us some good examples on how you all are fostering partnerships, yes, to lower greenhouse gases that are causing the climate crisis, but working on adaptation, as well.

So Ms. DeCoteau, I will start with you.

Ms. DECOTEAU. Thank you for the question. The Tribes in the Columbia River Basin have been engaging in innovative partnerships with many different partners. That includes the Federal Government, state and local agencies, as well as non-profits, as well as private industry.

And I think, you know, we have come quite a long way from where we were even 20 years ago, in terms of when we were in the courts often, and now we are working side by side because I think there is a recognition that we all need water, and water is necessary for municipalities, for the river, for recreation, for forests, for wetlands, and how do we all come together to really think about the future of water quality, quantity, and what it means for Tribes in particular, as it relates to salmon and other fishery resources, as well as our first foods, of course, that depend on water.

So the Tribes really have a holistic view when we think about projects and innovative partnerships, because we know that we can't address a problem in one watershed. We really have to look at the entire basin. That includes the estuary and ocean. And for us, you know, that is an issue where we don't have the expertise, but we are gaining more and more information to help us with our in-river management of these resources.

And as co-managers of those resources, you know, we do partner with the Federal Government. And in the last year we have seen tremendous allies, as well as cooperation from even just the Fed-

eral agencies coming together for the very first time to talk about the future of the Columbia River Basin. In the past, it has kind of been siloed into various agencies, but this is the first time that we have all really come together. And the Federal agencies, because of their trust responsibility to the tribes, are showing up, and they are really listening to the tribes' concerns and our recommendations for what we need to do in the future.

Ms. CASTOR. You are right. And there is a recognition that we need to do more.

In fact, in the Inflation Reduction Act—that we are hoping moves through the Senate to the House—provides additional resources for climate change planning, mitigation, adaptation, and resilience to insular areas. So I hope we will be able to follow through just on your recommendation.

Ms. Bell.

Ms. BELL. Yes, we work very closely with the government on—in a lot of different ways. Sometimes it is for our regulatory requirements that really drive our industry, and trying to get some more streamlined and consistent and stable guidance at the Federal, state, and local levels.

The government is often a client of ours in big infrastructure projects, so we provide valuable mitigation credits and permitting responsible mitigation projects to allow for the buildout of those projects.

And then also, we are actually working with the U.S. Army Corps of Engineers and Tribal nations on a First Foods Initiative, so giving access to Tribes to first foods that may occur on our—on the landscapes that we restore. And so that is a pilot project.

And so the government is a stakeholder in many, many different ways, and actually allows for the facilitation of us to work with a lot of other groups.

Ms. CASTOR. Thank you.

Dr. Chan.

Dr. CHAN. I think, as we move forward with climate—with the climate crisis, we need authoritative information. We need people that can produce information that all of us can trust about what are the changes ahead, and what are the best ways to move forward.

And now, I am excited, as I work with NOAA day in and day out, and that is an authoritative agency for providing us the best information that we need. At the same time, I get to work with some really, really brilliant people in academia. But my job is to help them tap into brilliance and exciting science to point us towards mission science. So that combination allows us to sustain the observations that we need, the researchers need, but also keep bringing in innovation from the academic community so that we do things better, in a way that is more cost effective, or gives us even better answers.

Ms. CASTOR. Thank you.

Dr. Placido.

Dr. PLACIDO. We are fortunate to work on a regular basis with partners at EPA, NOAA, the Corps of Engineers, the Fish and Wildlife Service, Forest Service, and both states, and many local and non-profit partners.

From our close partnership with EPA in particular, I think some of the things that we see on a regular basis—and we are really feeling that with their work that they have done with us in the Bipartisan Infrastructure Law. And not only is it, you know, kind of pushing us to leverage those Federal dollars—and National Estuary Programs average about \$22 per every \$1 of Federal investment, which I think is really important to us—but focusing on climate resilience and environmental justice. And kind of building our expertise in those areas has been appreciated.

Ms. CASTOR. Thank you very much.

Next we will go back to Representative Bonamici for another round.

Ms. BONAMICI. Thank you so much, Chair Castor.

Ms. DeCoteau, when the Select Committee was crafting the Climate Action Plan, we had a hearing on indigenous ecological knowledge. We investigated how indigenous peoples not only disproportionately experience the effects of climate change, as you mentioned in your testimony, but also how Tribal members are also leaders in addressing the climate crisis. And tribes are using traditional knowledge and scientific inquiry to help us build resilience and adaptation efforts.

So can you talk about how traditional Tribal ecological knowledge can help shape the approach to natural resource management, but how can Congress and the Federal Government better support your efforts and integrate that traditional knowledge more broadly into Federal policy?

Ms. DECOTEAU. Thank you for the question.

As you mentioned and in my testimony, Tribes are one of the most climate sensitive communities in the world, because we do depend on our resources. Our resources are our cultural resources. And we have been adapting for generations and thousands of years to a changing climate. So this is not new for us. We have a word for it, of course, but it is something that we have been doing because we really operate on a cycle of a seasonal round of when we harvest our first foods. And we have seen these timings come earlier and earlier, or we have seen the snowpack come later and later. And so it is affecting timing of all of our first foods, and so we have been seeing that.

My organization is different and innovative in that we have incorporated through our restoration plan called Wy-Kan-Ush-Mi Wa-Kish-Wit that looks at the entire life cycle of salmon—it is the only restoration plan in the Columbia Basin that does so—where we incorporate our knowledge, our general knowledge of our place and our land that we have had for generations and generations. We have also incorporated that into our science.

And so we have, excuse me, not only the coastal monitoring and estuary program that we recently acquired, but we also have our own genetics laboratory doing world-class genetics research on our salmon, our fish in our rivers. And so we have been able to combine our Traditional Ecological Knowledge with Western science to promote recommendations on the ground, and to adapt to climate change, and to provide projections for the future.

So I think—I will stop.

Ms. BONAMICI. Thank you so much.

Dr. Chan, I was inspired to hear your excitement about the innovation, the new students you are working with. And I wanted to talk a little bit about the workforce development pipeline.

When you are working with your students—you talked about the citizen scientists who are out there working with the fishing community. But could you talk a little bit about the workforce issues, the jobs that are available, and how students can learn about those jobs, and take advantage of the skills that they are learning at OSU, and what kinds of careers are available to them?

How are we going to meet the workforce demands as we are addressing the climate crisis, and what a difference preparation in an educational program like—that you offer at Oregon State, how can that prepare people for the wealth of jobs that are out there?

Dr. CHAN. So on the science side, there are things that we need, for example, if we are going to—as we move into wind power, how we monitor that effectively. Can we use autonomous vehicles to do that?

If we want to do marine carbon dioxide removal, how do we evaluate that that is really effective and worth the money?

As with new technology—and I think one key take-home is that the blue high-tech industry is just a high-tech industry in all your districts, but actually it just sounds a little more exciting.

When I talk with my partner in Salem—he is in the technology business—he said, “We can build these sensors. But what if I said we had to go up to 8,000 meters full ocean depth?” On the I-5 corridor, some of the best high-precision titanium casting in these businesses are right there, down the road. So we can work with all the other high-tech industries within the country to, you know, at least simulate this new, blue, high-tech sector.

And when I have a student come work with me, they might take classes and they might go look for a job and say, oh, I took four years of chemistry and physics. They might get a job. But what I want them to do is say—you can say I worked on a project where we took—we built a new sensor that fit into a crab pot. It is a video sensor, and we used artificial intelligence to process a signal before we sent it up. I think that student will get the job. You know, that is a proven problem solver.

And at OSU, we—there is a scale benefit, because we have an innovation lab at Hatfield. We have some state of the art fabrication equipment, and we are letting undergraduate and graduate students come work with us, with industry.

The exciting thing is that, if they discover—if they figure something out, they can build one or—one about the size of a, you know, a table. But if we need 1,000, or we need something that is 10 times the size, we have a high-tech industry that are ready to upscale that fabrication. So it is—we get to be the laboratory to developing some new tools.

Ms. BONAMICI. Thank you. And as I yield back, I just want to say thank you, because when we talk about addressing the climate crisis, we need to be talking about the jobs and preparing people to fill those important jobs. So thank you for your work.

And I yield back.

Ms. CASTOR. Yes, thank you, Representative Bonamici, for your special focus on workforce, not just for this part of the country, but

your leadership in the Congress that will help lift people all across America.

Next, Representative Carter, you are recognized for five minutes. Mr. CARTER. Thank you, Madam Chair.

Again, Ms. Bell, private companies buying into this, extremely important. And that is what I want to concentrate on. How can this committee make a difference?

How can we make a difference on climate issues, what are the best ways—what can we do? What are the best things we can do to assist the private sector in helping us to achieve what is all of our goals?

All of us recognize climate change. All of us want the same end result: to protect our environment. I have the honor and privilege of representing the entire coast of Georgia, where I have lived all my life, where I intend to live the rest of my life. I want my children, my grandchildren to enjoy that environment, just as I have. What can we do? What can this committee do to assist the private sector in helping us with our common goal?

Ms. BELL. Yes. I mean, I think that nature doesn't recognize for-profit or non-profit or, you know, whoever is doing the landscape-based solutions and bringing that to the table.

It is all a common goal, which I think that, Chair Castor, you mentioned earlier, we are all working towards the same goal, which is to increase climate resilient projects on the landscape and, really, you know, try to expand that footprint, and get to a more historic footprint that can help with these climate resiliency efforts.

And so just expanding opportunities for the private sector to let them come to the table and access some public restoration dollars. Whether it is through, you know, Housing and Urban Development or FEMA monies or whatnot, we can efficiently spend those monies to put resilient projects on the ground that are going to last and be protected in perpetuity, which is one of the standards that we have to, you know, operate by.

And so, really, I think expanding the—those opportunities to the private sector, and then also just reliable regulations—you know, environmental—

Mr. CARTER. How important is that in regulation?

Ms. BELL. It is incredibly important for us, because it seems like the pendulum is just swinging from side to side every four to eight years. And, you know, that affects our industry greatly.

We need compensatory mitigation, and we need the government to support that, and require development and mitigate appropriately, and that is important for the landscape, as well.

Mr. CARTER. Good. Let me ask you something else. I am very interested in your work that you mentioned about restoring wetlands. And we all understand, particularly in South Georgia, South Carolina, the low country, if you will, how important wetlands are, and providing mitigation offsets for that.

In your testimony you say that mitigation offsets provided by Westervelt Ecological Services has helped important public infrastructure projects gain approval from regulators, allowing these projects to begin in a timely manner. And we all know how difficult infrastructure projects are, particularly when we start talking

about the impact on wetlands, and getting through that and everything.

Can the—could the expansion of mitigation projects by the private sector be used to help move infrastructure projects along at a time—at a timelier pace?

Ms. BELL. Yes, absolutely. You know, with the investment and more restoration on the landscape, we can produce more credits, which can—and almost instantaneously—provide permit compliance requirements.

So credits, mitigation credits, are needed to have a permit approved. And if you are having to create individual projects on the landscape, you know, with each development project it takes a long time. But with banking, you know, it is a matter of two or three days. And we have provided all the mitigation for the California high-speed rail project, and really efficiently done so to help that project along and make sure that it is, in fact, developed. And the same goes for Colorado Department of Transportation, Nebraska Department of Transportation, Alabama Department of Transportation.

We have got projects going on the ground in Georgia, as well, which I am excited about, because we share the same alma mater of UGA. And so, yes, it is really important, you know, to get those projects on the ground so that we can support—efficiently and effectively support the development of infrastructure projects, and private projects, and non-government projects, and anything that may need an offset to—

Mr. CARTER. Okay.

Ms. BELL [continuing]. Progress their goals.

Mr. CARTER. Well, again, I want to thank you for being here, Ms. Bell, and all the witnesses for being here.

And thank you, Representative Bonamici, for hosting us here, and Chair Castor for having this.

Folks, this is important. We all agree that climate change—whether you are Republican, Democrat, independent, climate change has got to be addressed. And it is extremely important.

But there are other important things in our lives, as well. Today is August 3rd. Exactly one month from today, on September the 3rd, the Oregon Ducks will travel to Atlanta to play in the Chick-Fil-A Bowl.

Ms. Bell, do you have any comment on that?

[Laughter.]

Ms. BELL. I would love to be there. I love that.

Mr. CARTER. Go, Dawgs.

And with that, I will yield.

Ms. CASTOR. Thank you, Representative Carter of Georgia.

You know, all of the witnesses, they have done an outstanding job of highlighting your work here in Oregon on adaptation to the climate crisis, but I think we cannot divorce what you all are doing on adaptation from the urgent need to reduce greenhouse gases and reduce carbon—the carbon footprint that is really driving so much of the cost and the impact, whether it is these horrendous wildfires or—God bless the people in Kentucky after this outrageous, colossal rain event, where people lost their lives, or just everyday Americans that have to work in extreme heat.

You know, all of us being at the mercy of autocrats like Vladimir Putin, who wields his oil and gas supply like a weapon. And we know we—the world’s top scientists have said there is a rapidly closing window for action to reduce human-caused greenhouse gases and address the climate crisis.

So could you all—I will go across the board here again—highlight to me some of the things you are doing when it comes to adaptation that you think also has—is having a corresponding impact in reducing the carbon footprint and greenhouse gases?

Oregon, again, is a leader in the country on your clean energy goals, but highlight to me some of those—some of the projects that you are proud of in this area that can also be models for the country.

Ms. DeCoteau.

Ms. DECOTEAU. Thank you for the question. I would like to highlight—and I mentioned this in our written testimony and my oral testimony, but we recently released in February this year our—an update to our Tribal Energy Vision.

And as I said before, you know, we recognize that many of the threats that face our salmon are the result of production and consumption of energy. And we know firsthand because of the way the Columbia Basin now looks in terms of the hydropower that it holds.

So we have four broad goals in our Tribal Energy Vision that I will briefly go over.

One is to create a regional energy portfolio that protects and enhances our environmental quality, our treaty-protected resources from the Tribes, and supports the restoration of the Basin’s fish and wildlife to healthy and harvestable populations. And that is important because, in order to harvest them, they need to be healthy.

We would like to prevent new and reduce ongoing damage to the Basin’s resources, including fish, wildlife, water quality, our cultural resources, by recognizing the relationships and interdependencies of natural and built systems within the northwest energy system.

The third goal is to provide increased protection for fish and wildlife and utility customers against unanticipated events such as drought, fire, market operations, while providing an adequate, and economical, reliable electric supply.

And finally, to mitigate climate change impacts to protect the northwest ecosystems by replacing fossil fuels, electric generation, and reducing the reliance on fossil fuel for power, transportation, and other uses.

Ms. CASTOR. Thank you very much.

Ms. Bell.

Ms. BELL. Yes. On the Pacific Coast we have multiple projects. We have 20,000 acres in California that are close, relatively close, to the coastline that are in restoration, perpetually conserved restoration projects. And that is a big footprint to help with flood amelioration, drought, you know, coastal sea level issues. And a lot of those are tidally influenced.

We are also working with a public utility company in Oregon on a project we are under contract with to help with mitigation offsets.

But also, that will result in putting over 1,000 acres of restoration on the ground. And, you know, that also will provide regional climate benefits, as well.

So as far as, you know, restoration on the ground and the way that it contributes to—regionally to global climate change, we are trying to put some real ecologically functioning sites on the ground in the Pacific area.

Ms. CASTOR. We—and yesterday we did hear from scientists and those in industry on how important it is for forest management in reducing carbon pollution, just to the extent that greenhouse gases explode in some of these massive wildfires. So that is important.

Dr. Chan.

Dr. CHAN. Thank you. At OSU we run a facility called Pathway. It is a site offshore for marine renewable development. It is a permanent site so that private industry can come and test their best ideas in the ocean, because, you know, that is—if it works, if it survives in the Pacific Ocean, then we know it is going to survive. And that is an exciting area where we can actually change the energy portfolio that we have.

The other thing that we can do—and I just had a really fun conversation with a colleague at NOAA yesterday—is that—let's think about generating alkalinity, so that we can use the ocean to draw down more carbon dioxide, so go carbon negative, and we can use marine renewable energy to power those processes that generate alkalinity, and we can use the force of the Columbia perhaps to distribute that alkalinity.

So there is ideas out there that we need to think hard and make sure that they work well, and we need to do it in consultation with people that are affected. But, as long as everybody is on the table, I would bet for our ability to solve this.

Ms. CASTOR. Thank you.

Dr. Placido.

Dr. PLACIDO. I already mentioned several actions that we take with our restoration work. So I want to think a little bit about some of the things that we do outside of our restoration work, including green infrastructure and stormwater projects with local communities.

We work with school districts to do de-paving events. It is on school grounds, fantastic projects, reduce some of that impervious surface and plant more trees, create green space. It provides some islands of cool air during warm summers that we are seeing more increasingly.

We also restored riparian areas this—over this last year, including the work that we did at Steigerwald National Wildlife Refuge. We planted over 500,000 trees. That is a lot of trees. So I am in complete agreement with Representative Carter that trees are very, very important.

Ms. CASTOR. Well, thank you again to all of our witnesses.

I also want to thank my colleagues, Congressman Carter of Georgia, and your climate champion from right here in northwest Oregon, Suzanne Bonamici. It has been a pleasure and an honor to serve with both of you and work on climate solutions.

I want to thank everyone here at Clatsop Community College for hosting us and the people of Astoria. Thank you to the folks in the

audience who have come to hear our discussion on climate solutions today.

I also want to thank the folks who traveled from Washington, D.C. with the House Recording Studio to make sure that this hearing from Astoria, Oregon could be transmitted across the country.

And thanks to the local radio broadcast, as well, for making this available to the citizens of Oregon.

Thank you to the professional staff, who have worked very hard on this field hearing.

I know that this is—here in Oregon you don't get a lot of congressional hearings. I know that you are tuned in to C-SPAN, though, on a regular basis, and I encourage you to do so to follow the work of our Select Committee on the Climate Crisis.

Our website is climatecrisis.house.gov. At that website you will be able to monitor our progress.

A few years ago we released a Climate Crisis Action Plan after a—over a year of outreach, broad outrage across the country from scientists, Tribal leaders, faith community, innovators. We traveled, and we heard recommendations. We compiled all that into a Climate Crisis Action Plan. And on our website now you will be able to track our progress. We had 750 recommendations in that plan.

As of today, we have passed over 400 of those recommendations in the House of Representatives, and over 200 have been enacted into law and contained in the Bipartisan Infrastructure Law, the new CHIPS and Science Bill that was passed just last week, through the National Defense Authorization Act, through the appropriations bills, and now there is a big climate bill pending in the United States Senate, the Inflation Reduction Act, that hopefully we can get across the finish line, as well.

But we need your continued input and advice. And that is why it is so invaluable to be able to travel here to Oregon to hear directly from you. Thank you again.

And at this time are there any unanimous consent requests?

If not, we will call the hearing adjourned. Thanks again.

[Whereupon, at 11:20 a.m. (local time), the committee was adjourned.]